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THE GEOGRAPHY OF THE NORTH-WEST FRONTIER OF INDIA.*

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Nine hundred miles of frontier boundary, lengthened greatly by many a twist and curve, extend from the north of Peshawur (let us say the Malakand pass) to that point not far north of Karachi where it takes to the sea. This is a distance half as far again as from the Isle of Wight to the north coast of Scotland, and it is as varied in geographical feature and landscape, as full of ethnographical problems, as interesting a study to the geologist or the strategist, not merely as the length of our familiar Great Britain, but as any 900 miles of borderland that can be found in the world. Taken as a whole, it may be considered as the edge of a region of great elevations. Wherever you set foot across the Indian frontier, you place it on the first steps of a staircase which leads through narrow portals by a series of successively higher landings, till (striking northward) you arrive at the roof of the world; or (striking north-westwards) you cross by somewhat lower grades the uplands of Afghanistan and the stony flats and deserts of Baluchistan. Then you reach the mountains and highlands from whence not only the vast majority of the people of India, but most of ourselves also originally emerged as prehistoric nomads. As the great waves of antique humanity which flooded Indiawards set their backs to the north and turned their eyes to the land of promise which lay under southern skies, they all found themselves face to face with the practical difficulty of crossing the mountain borderlands of India, and descending to the plains through the cracks

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and the staircases of the frontier, which we now know so well. It was no case of forty years' wandering in the entanglements of the wilderness, and then the realization of their hopes with them. In many instances they never reached the land of promise at all. Of those that struck against the Himalaya to the east of the Indus, it may fairly be doubted if any succeeded in effecting a passage. There are their remnants—the flotsam and jetsam of many a past nationality—clinging to the skirts of the mountains, or hiding in their inner recesses to this day. But on the north-west geographical difficulties were not so insuperable. The Kabul valley on the north, the uplands of Herat and Kandahar, and the long troughs of the Makran rivers on the south, let in hordes of Skyths, Aryans, and Dravidians, who absorbed the aborigines of the plains, and now constitute the mass of the Indian population. Yet many a remnant has been left on the border, and it is the extraordinary assortment of divers peoples and tongues, and the intricacies of intertribal relationship derived from prehistoric connection, which forms the peculiar ethnographical interest of the borderland. Similarly, its geological evolution by means of those vast slow-moving processes of nature which first upheaved the frontier highlands and then wrinkled and compressed their edges into parallel folds, leaving fissures or cracks at intervals for the rivers to pass from the highlands to the plains, gives us the key to its configuration.

The climate and the scenery of the frontier are not less varied than its peoples. On some of the slopes of the northern mountains, amidst forest of pine and deodar, where the goddess Flora has touched the hillsides with her wand, and the olive and the pomegranate throw black shadows under an Italian blue sky, the climate is sweet as any climate can be in this incomplete world; but it is not all sweet. There is a region of dusty heat where the sun looks white through a yellow haze, and the shiny surface of the glaring sand-strewn "putt" sheds the scaly skin left by last season's overflow under the blinding heat; where no water is that is not salt, and where no shade is but the occasional shadow of a great rock in all the weary land—a district well enough known to most wanderers on the frontier—which is frequently quoted as the nearest approach to the conventional "jehannum" that this world affords. I know another tract, a little away from the haunts of the frontier official, where not a living thing is to be found. It is said that even flies refuse to live there!

Thus it is small wonder that the popular idea of the Indian frontier is much mixed, and that military service on the frontier is as cordially disliked by some as it is the oft-quoted theme of fond recollections by others. It is with the hope of making plain a few of the broader characteristics of frontier geography, affecting as it does all the conditions of frontier life, that I am here to-night.

Inasmuch as big mountain chains, where they exist, exercise a

preponderating and dominating influence over all other physical characteristics of a country, and as the whole north-west frontier of India is mountainous from end to end, we may very well begin by sketching the main geographical features of it in two sections—*i.e.* the northern section of hills belonging to the Hindu Kush system, and the southern section over which there looms the straight-backed masses of the Sulimani and their continuation southwards into Persia. For all practical purposes this division corresponds to the political division which has just lately been established between the new province, or agency, of the north, and the Baluchistan agency of the south; with the ethnic division between an aggregation of tribes who are wholly Pathan (*i.e.* Pushtu speakers), and another aggregation which is chiefly Baluch; also with a very distinct division between certain physical characteristics in climate, biology, and scenery.

That particular parting of the frontier-line which allows the Gomul river to pass from Afghanistan to the south of Waziristan we may take as the dividing-line.

It may at first appear that the far-away central chain of Hindu Kush can have little geographical connection with the immediate frontiers of India; but a little careful tracing out of the plan of the mountains on the map will show you that from the north of the Peshawur plain to the Kuram valley, when we step from the plains on to the foothills, we are treading on the outermost skirts of those extended spurs which, in one continuous and generally unbroken water-divide, reach downward from the Hindu Kush and embrace the Kabul river-basin. That remarkable offshoot, the Shandur range, which, starting from the head of the Yarkhun, or Chitral, or Kunar river (for it is all the same river), shuts off the narrow valley of Chitral from the headwaters of the Gilgit and the Swat and Panjkora—across which lies the dreaded Darkot pass to the north and the Shandur pass between Chitral and Gilgit—continues as a strictly conscientious water-divide, admitting of no breaks, down the eastern side of the Kunar valley. Here it lowers its crest and allows the existence of several passes, which were once somewhat easy links on the high-road from Kabul to India; then rising again slightly where the Kabul river forces its passage by a devious course between conglomerate cliffs (the first break in its continuity since its commencement), it finally culminates in the great level range of Sufed Koh, the dominating feature both of the Kabul and the Kuram valleys. For all its giant independence, entitling it well to rank as a great individual range, the Sufed Koh has thus a distinct geographical connection with the Hindu Kush, and it practically rejoins its old mountain system by means of the low water-divide which heads the Kabul river. Thus the Kabul basin is embraced, as it were, by a long sinuous arm of the Hindu Kush, and the Kabul river forms no exception to the almost universal frontier rule,

that the rivers of the plateau should pass through a gate of the hills hewn right across the axis of them, ere reaching the Indus flats. When Kelly's relief force from Gilgit forced its guns painfully through the snows of the Shandur, it was really crossing the same great divide which is marked by the Lundi Kotal (the Khaibar pass) beyond Peshawur.

South of the Sufed Koh, between that range and the Gomul river, the mountain conformation is comparatively unsystematic and irregular The long southern spurs of the Sufed Koh (one of which is represented by the Samana ridge which shuts in the Tirah, and another by the Shutargardan) tend to radiate, and their rugged limestone ridges, flanked by a mass of hills of recent formation, extend to the river Indus.

The Kuram valley and the Tochi form no exception to the general rule of main frontier valley formation. They too are tied in at their exit to the plains, and their drainage passes out through mountain gates—gates which so restrict the outflow that past centuries of detritus has accumulated behind them; the grade of the stream has shaped itself to meet the alluvial formation, and we thus get wide spaces of cultivable land, which are terraced and revetted into level fields, and form those landscapes of fertile beauty, with scattered orchards and half-concealed villages, which are so delightful in the early summer season of the frontier. But whilst these main valleys (which also afford the main lines of approach to the plateau from the plains) are usually distinguished by wide spaces of almost phenomenal fertility, the lateral feeders of the main streams which bring down the detritus scooped out from between the narrow intervals between the long lines of tilted strata on either side, afford quite a different class of frontier valley scenery. Here the rough-hewn edges of the broken strata form cliffs which look straight into narrow confined troughs at their feet, with the course of the mountain stream (when there is any stream at all) broken by boulders and waterfalls, amidst a space so narrow that it is frequently impossible to find passable footway. And where the main streams themselves pass through those limestone gates of which I have spoken, there is frequent occurrence of gigantic gorges smoothly cut and fashioned through the hard grey rock, gorges from the depths of which you may look up for thousands of feet to the narrow ribbon of blue sky above. These two varieties of frontier valleys include nearly all the valleys of the great borderland between the plains and the plateau, and the description applies equally to the Baluch and to the Pathan border.

South of the Tochi, Waziristan forms a little geographical Switzerland all to itself on the border. There are no roads through the Waziri hills and over its western watershed into Afghanistan. There are roads afforded by the usual cross drainage into it, and round it, but not across it.

So far we have been dealing with the Pathan (or, as it lately was,

the Punjab) borderland. It is this country mainly which forms the new province, or agency, which has just been formed in India. The point to be noted about it chiefly is that it belongs to a northern mountain area in all its chief physical aspects. The deodars and pines which grace the slopes of Jakko in Simla, which stand out with more of the dignity of isolation in Kafirstan, and are to be seen high on the slopes above Kunar and Chitral, also group themselves gracefully over the grass slopes to the west of Waziristan. The dark round holly-like bushes of the young ilex which are studded over the yellow slopes of the Waziri hills, and the spreading poplar which gives such graceful shade, are trees of the Himalaya. The wild olive grows everywhere, north and south alike, and so do many other trees; but pines are scarce and rare to the south of the Gomul. The deodar is replaced by juniper, and the ilex by the pistachio. It is these trees which form such a characteristic feature in mountain scenery generally, and which certainly give an impression to the traveller in Baluchistan that in crossing the Gomul southwards he has struck a new country. He may, indeed, at first think himself fortunate if he sees any trees at all.

Here, to the south of the Gomul river, commences a new mountain system—a system which, while it exhibits many of the essential features of the northern orography, claims a distinct constructive anatomy of its own. When the great hinterland of the border emerged from prehistoric seas and became dry land, the result as to those edges of it which border the Indian plains is not unlike that which you may observe any day when a rippling tide recedes from a sandy shore. Innumerable ripples, or wrinkles, or folds were formed, not, certainly, by a receding tide, but by the tilting of strata from a line of central upheaval, which, in their general structure (exhibiting the steep edges of the broken strata on one side and the tilted flat backs of them on the other), are very similar in the general appearance of their formation to gigantic sand-ripples. The tilted strata are rocks of comparatively recent formation. The upheaved central line is composed usually of limestone, which is here and there piled up to enormous thicknesses, measuring thousands of feet, and often carrying with it into high altitudes shells and fossils of quite recent types. From these superficial indications you can imagine the general plan of Baluch border mountain construction for yourselves. Line upon line of ridge and furrow, long dominant sharp-backed ridges with jagged saw-like outlines; short thin ridges packed in between as tightly as they can fit; here and there a huge massif of limestone upheaved in grand outlines, upsetting the regularity of minor construction—all running with a parallel trend from north to south, facing India, present about as formidable a barrier to further advance as may well be conceived. Such a phalanx would indeed be impassable, but that its serrated ranks have been cracked across at intervals (as I have already said) to admit of the passage

of the drainage waters from the uplands beyond them to pass to the plains of the Indus. The main streams have held their own way through them, cutting out their own gateways and gorges through conglomerate and limestone, through all geologic changes, and it is these gateways and gorges which are our approaches to the uplands.

The narrow little troughs between the ridges have, of course, been scooped out by successive floods till there is little enough left but bare rock, but there are now and then small bays and offsets to the main streams on either side, where land can be terraced and irrigated, and villages can find a footing.

The regularity of these parallels and approaches which guard our frontier between the Gomul and the Arabian sea, and then continue through Makran and Persia to the head of the Persian gulf, is much disturbed between Sukkur, on the Indus, and Quetta, on the highlands. There a great wedge of sandy desert and Indus alluvium (called putt) breaks into the line, the effect, or result, of some hidden force of nature which has diverted the mountains, curved them from their course, and piled their thousand ridges into a tangled knot round Quetta. Here, as might be expected, are some of the highest peaks of the frontier, running to 11,000 feet and more, overlooking the plain on which the pretty station of Quetta stands. The sand and putt-covered wedge of Gandava is the opportunity for our railway, which is thus carried much farther west on the flat plains before mounting the hills than would be possible elsewhere. Beyond Quetta, between Quetta and Kandahar, the great border ridges and ranges still keep their rigid way from north-east to south-west, preparing for the great sweep westwards of half their company. The Kojak is one of them. The other half company preserves its southerly trend past Kalat to the Karachi frontier, and forms a phalanx of stiff-backed, sheer-sided, wall-like obstacles to any advance from Sind that is, I believe, unsurpassed by any frontier in the world.

As to the character of this southern border scenery, where the great central masses of limestone are piled in the grandeur of an eternal disarray of cliff and chasm, of towering peak and deep torrent-washed gorge, to a height of over 10,000 feet (as, for instance, in the mountain known as the Takht-i-Suliman, which gives its name to the system generally), there is no lack of magnificence in outline, or of the grace of picturesque vegetation. The Chilghosa pine stretches out its weird white arms all over the heights of the Takht, and over many another mountain peak besides, and it is no less striking here than it is on those other heights overlooking the Indus—the heights and slopes of Astor, in Kashmir. And from the summit of these great hills, who shall describe the grandeur of the view? To me there will always be an impression, first, of stupendous depth, then of line upon line of jagged mountain-top growing out of this depth, a silent shimmering

sea of misty grey hills sharpened into points and pinnacles, a faint white stretch of plains beyond, and a far-off blue-black streak marking the riverain of the Indus. But below the summits of these mountains, amongst the ridges or on the uplands, where one is not overpowered by the vastness of the enclosing walls of some deep gorge, or fascinated by the occasional revelation of gentle olive-covered slopes sweeping down to a central band of green vegetation; when one is not wandering amongst the junipers of Ziarat, or stretched amongst the early summer tulips and narcissus of the Kojak; but when one is making a slow and painful progress in these waste places which form the vastly greater portion of Baluch country-side—what about the scenery then? Arid and dry, with the white hot haze shimmering about the rocky crags of the scaly hills; a small salt trickle meandering through the stony nullah bed, and leaving a sticky leprous edge along its yellow banks; the stunted tamarisk powdered with salt and dust, all grey, khaki, dun-coloured, and glaring—the Baluch landscape is not so alluring. And there is so much of this, and so little of the other, as to lend a certain reasonableness to the Baluch tradition that at the creation of the world the rubbish was piled into Baluchistan. And yet we must remember that throughout that wild southern borderland, into the inner recesses of which but few Europeans have ever really penetrated, where there must exist thousands of peoples—Baluch (or Arab) peoples, Aryans, Dravidians, and Pathans—who have never seen a white face and never heard an English word spoken, there are still infinite possibilities of development. What has been done in Peshin or Zhob, might be done in a hundred other valleys, not so extensively perhaps, but yet with ample justification for the hope of fair returns. Indeed, there are dozens of spots which might be pointed out where the evidences of an old and better order of agricultural development are abundantly evident, especially in Southern Baluchistan and Makran. Baluchistan is, indeed, an old country once developed and civilized, now withered and dried, and the problem to be usually dealt with is that of bringing water back where water once existed and exists no more.

A few words about the infinitely varied ethnical features of the frontier may not be out of place, and I will endeavour to draw the line of distinction between the main features of this complicated agglomeration of varied nationalities as broadly as possible. The most simple division of the frontier tribes-people will be that which places them in two great communities, *i.e.* the Pathan or Pushtu speaking fraternity and the Baluch. In this great ethnic division the arbitrary line of geographical division which I have selected as being represented by the Gomul river is not entirely satisfactory, for there are, as I have already pointed out, large and important Pathan tribes existing not only in the Sulimani mountains to the south of the Gomul,

but extending southwards to the Quetta district. Indeed, the parallel of latitude on which Quetta stands more aptly defines this ethnical division than does the Gomul river. There are no true Baluch tribes in the Zhob valley, although this valley is an integral part of the politically defined Baluchistan province, or agency, and thus it happens that the occupation of the Zhob valley which shuts off the Sulimani mountains from Afghanistan is a strategic movement directed against Pathan rather than against Baluch tribes-people. There is a third section of border peoples in the far north, the Chitralis, who claim no sort of affinity, excepting that of religion, with their Pathan neighbours. They are a very ancient race, belonging rather to Himalayan than to Indus frontier ethnography, and we must for the present pass them by. South of Chitral the Pathan races, who occupy all the northern sections of the long straggling new province of the frontier are chiefly represented by large tribal communities of Afghan origin. The Yusufrais of Swat and Boner, and the Mohmands, who spread southwards over the barren hills which overlook the Kabul river, are all of Afghan origin, claiming ties of race affinity with the Durani Afghans of Afghanistan. So that here again the political boundaries are by no means coincident with ethnical divisions. We find large and important tribes of undoubted Afghan extraction who are beyond the border of political Afghanistan, and it was the separation between them and the parent stock, effected by recent boundary demarcation, which was one of the chief causes of the serious risings on the north-west frontier which culminated in the Tirah campaign. But whilst all Afghans are Pathan in so far as they have adopted the Pushtu tongue, all Pathans are not Afghan, and south of the Khaibar we find in the Afridis, Orakzais, Waziris, Sheranis, Kakurs, etc., races whose origin is not always easy to define—large and powerful communities, always ripe for mischief, who have never within recent historical times been efficiently under control, either from the side of India or Afghanistan. They claim no relationship with the Afghan. They are some of them older races than the Afghan—a people who have held their mountain fastnesses against all outside aggression for more centuries than we can tell; and yet they are in no sense aboriginal, for they belong to one or other of the innumerable Aryan or Skythic overflows from the highlands of Central Asia which have peopled India, partly displacing, partly absorbing, the non-Aryan races which existed before them. But non-Afghan though they may be, they are co-religionists with the people of the Amir, and it is westward and northward toward the ancient land of their early beginnings that they will inevitably turn their eyes for refuge and assistance in times of difficulty and danger. When we talk of the Mohammedan religion in connection with India, and speak of the British Empire as a Mohammedan as well as a Christian empire, we must remember that the strength and vitality of

Islam in India, its fanaticism and its orthodoxy, are really maintained by these frontier peoples, and perhaps by one or two of the native states of the peninsula; not by the great mass of Mohammedan peoples of the plains, who form by far the larger proportion of the fifty million of Mohammedan subjects of the king. The Mulla is of little account in Lower Bengal. It is only amongst the Pathan peoples of the north-west frontier that he is a moving political force. His voice, indeed, is not much heard south of Quetta, where, whilst we are still dealing with orthodox Mohammedan tribes, we meet with peoples as distinct from the Pathan of the north in social organization as they are in ethnical affinities.

The inhabitants of Baluchistan are as varied in their nationalities, and as ubiquitous in origin, as are the inhabitants of Afghanistan. They range from the pure Persian to the pure Dravidian. Turks and Rajputs, Kurds and Monguls, are all to be found amongst them. But the dominant tribes are represented by a great community of people of Semitic origin, and when we speak of Baluch we usually mean one of the great Rind federation. The true Baluch is not of very ancient extraction. He can usually be traced to Arabia or Syria, and he probably owes his existence on our frontiers chiefly to the Mohammedan conquest of Sind in the eighth century of our era, which established Arab domination on the Indus for nearly three centuries. There were Arabs in the West of India long before then—they were there long before Alexander's time, and they have left the mark of their colonies in Southern Baluchistan as imperishably as any that may be found in Rhodesia. But the modern Baluch usually traces back his pedigree with great confidence to the tribe of the prophet, and cares to go no farther. In appearance, in manners, and in disposition, many of the finest of the Baluch representatives are almost typical Arabs of the town-bred class, such as one may meet in any of the coast towns of Arabia, and always be glad to meet again. As a professional robber and raider the Baluch is in no way inferior to the Pathan, but his methods differ, and his standard of ethics is undoubtedly higher. The quality of chivalry is not forgotten by these descendants of a people who claimed affinity with the Saracen, and loyalty to the chief of their clan is traditional; loyalty to his chief with the Baluch takes the place of the Pathan's blind confidence in his mulla. It is sometimes asserted that the Baluch tribesman is a much easier man to deal with politically than the Pathan. This is certainly true to some extent, for he is far more faithful to his engagements when made, and far more open minded in the making of them. But it is due to no lack of the quality of courage or independence. The success of the Baluchistan administration, which for so many years has differed in many important respects from that of the Punjab, must be attributed largely to the wisdom of its conception in the first instance. Baluchistan, indeed, of

late years has been in the position of that happy land which has no history. Not a single important tribal rising has occurred since the first occupation of Quetta.

The political geography of the frontier is a matter of too great interest just at present to be passed over, and we must devote a short space to it.

It appears to me to be very little understood that for fifty years the red ribbon of British occupation has not materially shifted its position on the north-west frontier of India. We took the Punjab from the Sikh, and Sind from the Amirs who ruled it, about sixty years ago, and where we found their frontier-line drawn, there it is, for the most part, drawn now. It is all very well to call it an unscientific frontier, but the hard-headed Sikh of the north did not do badly when he set that line at the foot of the stony frontier ridges, saying, "I will take all the flats and the plains, the cultivation and the jungles of the Indus riverain, and you may have whatever you can make of the sun-baked hills and valleys beyond." Nearly all along the frontier there is a very respectable width of stony glacis, separating the hills from the alluvial tracts, uncultivable and yet open. There was, probably, no very strict demarcation in pre-British days. Those slopes of stony "dasht" were the practical hedge between Sikh and Pathan. Of course, from the military point of view, a frontier which admits of a long craggy arm reaching out from the mountains into the plains separating the valley of Peshawur from the valley of Kohat—an arm wherein an enterprising foe can collect his people and do infinite mischief by sudden descent on either side—is most unscientific; but there it was in the time of the Sikh, and there it is, with a minor arm to the south of it, still. No change has taken place. We have not occupied it, and but very few indeed of the frontier officials have ever seen the interior of it. As for the Baluch frontier, south of the Gomul, there is nothing much to be said about it. For mile upon mile a solid uncracked wall of rock, several thousand feet high, faces the sands of Sind, and makes as perfect a barrier as art or nature could desire. Directly across that barrier, behind which lurk the Dravidian peoples of the south, no European ever passes. Only by the two great recognized passes of the Baluch frontier, the Mulla and the Bolan (with which I include the Harnai railway route, as both centre on Sibi, at the head of that Gandava sand-wedge of which I have spoken), can one reach the Brahui hills.

Such, then, is the true boundary of British India, and beyond it (with the exception of that restricted area which we call British Baluchistan) lie the independent Baluch and Pathan peoples of the borderland, governing themselves after their own feudal system, subject to tribal laws, and only subservient to British authority in that they are bound to preserve peace on the border, and keep their own frontier

intact. Beyond them, again, lies Afghanistan, and the recent demarcation of the boundary between these independent tribes and Afghanistan, which led to a not unnatural fear of absorption into British territory, was the dominant cause of the late general rising of the tribes on the north-west frontier. But their removal from the sphere of interference on the part of the Amir did not mean annexation to British India, and to maintain that the red line should be drawn on our maps so as to include Chitral, Kuram, Tochi, and Baluchistan is only to repeat the error which was made by the ignorant tribes-people themselves. But the security of our frontier from aggression in certain parts of the border, and the necessity for enforcing our principles of peace on the frontier everywhere, have necessitated the occupation of certain lines of approach, and certain advanced posts dominating Chitral, the Khaibar, the Kuram, Tochi, Gomal, and Bolan (all of which are highways of more or less significance into India from the plateau), which serve these two purposes, giving us the power of direct control over these wild mountaineers in a degree which is more or less effective in different parts of the frontier. Only in Baluchistan have we acquired the right, partly by conquest recognized in the treaty of Gandamak, partly by the ordinary business procedure of paying a quit-rent for possession, to enclose certain districts (Peshin, Tal Chotiali, Sibi, etc.) which centre about Quetta, and to call them British. Here British authority is as fully established as in any part of British India, the forms and methods of administration being of the regulation pattern.

As regards the degree of independence enjoyed by the various "independent tribes of the frontier," it can only be said that it varies greatly with the geographical conditions of their habitat, and the strategic value of our lines of occupation. In some parts of the frontier (notably in Baluchistan) the European traveller may move in fairly comfortable security, and often be hardly able to recognize the fact that he is not on British Indian soil. In others (notably amongst the wilder Pathan tribes) it would be exceedingly risky for him to cross the border without a strong and well-armed escort. In yet others it would take a whole division of troops, and all the accessories of a small campaign, to enable a frontier officer to inspect the line of boundary pillars which he has himself but recently set up. Within the recognized limits of British India there are a large number of native states governed by their own hereditary chiefs, independent of British control except in such matters as might affect the security and peace of the Empire, around which we are accustomed to draw a yellow line in our maps to signify that they are not yet our property. It appears to me that the independent tribal provinces of the frontier should be treated in exactly the same way. Much of the confusion which exists in the mind of the public between the meum and tuum of borderland political geography is caused by a want of clear definition in our maps. If, on the other hand, all is to be coloured

red which betokens the sphere of British influence (a term which may mean anything or nothing), then we may as well make our red line conterminous with Persia, with Russia, and with China at once.

Two provinces or agencies now represent Indian border administration on the north-west. The northern of the two has just been formed as an administrative unit independent of the Punjab Government. It includes a long straggling strip of independent mountain borderland stretching from the Gomul river to the Afghan border beyond Chitral, as well as that section of British India which lies between the Indus and the frontier. To the east of it is the Punjab and Kashmir; to the west there is Afghanistan. It will be observed on the hand map that the red line of British possession has been drawn round Kashmir. This is not strictly accurate, for Kashmir is a native state as independent as some of those in the Indian peninsula; but it was more important to define the independence of those tracts which lie between Kashmir and Afghanistan than to emphasize the independence of Kashmir itself. It must be remembered that Kashmir was once British property, acquired by right of conquest from the Sikhs, and it is at the present time so much in British occupation that it has come to be regarded as the traditional playground of the Englishman in India, and almost as a part of the empire. Kashmir, however, forms no part of the new administrative charge, which is concerned almost entirely with the Pathan border tribes existing both within our frontier and beyond it. The watchful political eye of its commissioner will be on Chitralis, Swatis, Mohmands, Orakzais and Afridis, Turis, Dawaris and Waziris beyond the red line, as well as on the Khuttaks and Bangashes of the Kohat district within the red line, but beyond the Indus. These are mostly Pathan peoples, and they represent an agglomeration of nearly all the most troublesome tribes of the Indian borderland, scattered through a most difficult country extending for a distance greater than that intervening between London and Edinburgh. It is indeed a thorny charge, and the result of a scheme which separates it from the well-tried and carefully constructed machinery of Punjab administration will be watched with an interest which will not be altogether free from anxiety.

The Baluchistan agency, which equally includes an area of territory pertaining to British India as well as a vast wide space of mountains and desert occupied by absolutely independent tribes, has long ago justified the administrative system which was first introduced by Sandeman. The success of his form of political supervision over the diverse interests of the infinitely varied nationalities represented in the Baluchistan agency has doubtless prompted the counsels of the Supreme Government in effecting another border agency on similar principles in the north, and thus relieving the Punjab Government of a most responsible burden. But neither the ethnographical conditions of the southern

border, nor the strategical position which we occupy in relation to the tribes themselves, are the same in the northern borderland as in Baluchistan. And the idiosyncracies of the people differ. The Baluch chief is the real (and not merely the titular) head of his clan, and he is not in the hands of the mulla and the fanatic. And in that part of Baluchistan which is peopled with Pathan democrats, again we occupy a better military position than we possess in the north—a position which entirely dominates them, and, in fact, leaves them no option but to behave themselves.

No geographical sketch of the frontier, however imperfect, can pass without a reference to those conditions which determine our strategical position thereon; and these conditions are not so complicated as they would often appear to be. The northern flank of the frontier is protected by a vast wilderness of mountains, so unbroken in its massive continuity that the interminably long narrow valleys which wind about its recesses afford the only practicable foothold for man or beast. Between the Indus and the Kunar (or Chitral) river, across the southern outlying spurs of the Hindu Kush, strategical lines of approach to India are so little worth consideration that we will waste no time in discussing them; and although certain passes practicable for small parties of travellers do certainly drop into the Chitral valley from the north, leading downwards from the Pamirs and Badakshan, I will (having seen something of them) set them also on one side, merely remarking that all these problematical routes to India pass within reach of the dominating fortress of Jalalabad. A serious menace to India from the north can only be directed along one or two lines. One is the historical valley of the Kabul river, the open road down which Aryans and Skyths, Greeks, Afghans, Monguls, and Turks have swarmed into the plains, changing the destinies of India and altering the roll of its nationalities. Beyond Kabul are the snow-bound barriers of the Hindu Kush, but they are traversed by roads fashioned on European models, which bring the traffic of the Oxus to the streets of the city. It is Kabul itself which blocks the way, and the Amir is the true warden of this northern frontier.

Another line is on the south, where there is the more open approach over the "dashts" and deserts of the Persian border—by Herat, Sistan, or Kandahar and Quetta. From the Caspian to Quetta a traveller may pass without encountering a single formidable pass, without rising to higher altitudes than are indicated by Quetta itself, some 6000 feet above sea-level.

On the extreme west, again, is the ancient high-road from Syria and Persia, which lies through Makran. By this way India received her contingent of Dravidian and Semitic, or Arab, peoples. For centuries the whole Indus valley lay under the sway of the Arab who passed by this route. But Makran is within reach of the sea, and whilst we have

command of the sea, we may regard the Makran gateways as locked. Between the northern and southern routes of Kabul and Kandahar, across the borderland of independent tribes, there are, indeed, passes innumerable intersecting the mountains. But these also may be held as practically unimportant so long as the two great avenues of Kabul and Kandahar are in our hands, for they are narrow, rugged, easily defensible, and within striking distance of one or other of these two great strategic centres.

Our borderland posts and lines of occupation to the north and south respectively, are, from their geographical position, rendered distinct in purpose. Those on the north are well enough adapted for purposes of political control and observation both of Afghanistan and of the independent border, but they have not much strategic significance in themselves. We should not sit still and wait at the Malakand or the Khaibar, at the Peiwar or Wana, were a serious invasion from the north threatening us. They are not defensive positions, nor do they even completely dominate the independent tribespeople they are supposed to overlook, for they are not sufficiently in command of their western communications with Afghanistan; but with their assistance we can readily secure the means of occupying stronger and better strategic positions beyond them—they give us a right of way—and so far they are invaluable adjuncts to our strategic frontier.

On the south the geographical conditions are different. Not only does the position of Quetta, with its remarkable command over divergent ways to north and south, to east and west, render it a strategic position of importance such as can be claimed by no other position south of Jalalabad and Kabul, but an easy line of occupation and a connected chain of posts along the line of the Zhob secures to us the back premises of the Pathan border tribes of the Suliman hills, and thus gives us an assured guarantee for their good behaviour, which is sadly wanting further north. The unruly mountaineer hesitates to sharpen his sword and sling his jezail for a foray across the border eastward, when he knows well that, with the coming of the inevitable reprisal, he will find no convenient exit by his back door westward into the universal harbour of refuge for evil-doing Mohammedans—Afghanistan. So that, locally, we are strong in the south. And in the wider sense of Indian defence we are even stronger. For Quetta must be regarded as the bulwark, not merely of Sind, which lies behind it (there are no high-roads into the heart of India yet across the wastes of Sind and the deserts of Rajputana), but of the same northern valleys and plains of the Punjab, which have ever been the objective of an advance from Kabul. The Arabs who passed through Makran to the conquest of Sind never reached Delhi through Sind. But they reached the Peshawur valley and Kashmir, and there they remained. So that it is ever northward that we must turn our eyes, remembering that the geography of to-day

(though it may be modified by railways) does not vary with the introduction of new military weapons and methods, and that to secure India from aggression in the future we should study the pages of the past, and keep our special reserve of strength for the Kabul valley and the gates of the Punjab. What we have learned anew (as much from the experiences of Tirah as from those of South Africa) is the deadly facility of defence which mobility in a rugged country ensures. It is a good and a useful lesson which may comfort the hearts of those who think that it would be an easy matter to repeat history and to overrun India once more from the highlands of Asia.

After the reading of the paper, the following discussion took place:—

General Sir JOHN J. H. GORDON: We have listened to-night to a most interesting lecture, which I am sure, with the views displayed on the screen, has given every one here a graphic picture of the wild borderland provided by nature as India's defence on the north and west. No one is better qualified than Sir Thomas Holdich to adequately present to us those literary and pictorial sketches of nature in her boldest moods. What he has described to-night has brought back to me vivid memories of an interesting part of the north-west frontier of India, which he and I visited together some years ago, when he did so much to fill up a great blank in our geographical knowledge of that important region. A point to be noticed with regard to this vast and formidable breadth of mountainous country lying just beyond the threshold of India, is that its inhabitants are all splendid fighting men, who glory in the fact that kingdoms and armies have come and gone, but that they remain independent. All the best fighting elements of Central Asia seem to have been gathered into this stronghold. The wild scenery has produced turbulent men. Time may bring home some civilization to them, and at this moment, under the hand of an able and strong Amir of Afghanistan, some advance is being made in this direction. There is an immense amount of interest in the subject of this lecture, human and otherwise, which I do not feel capable at present of commenting fully upon, and if the little I have said has been more from the soldier's point of view than from the philosopher's, I trust that my predilections will be accepted as my apology.

Sir RICHARD TEMPLE: I obey your behest to say a few words on this most interesting subject. Time was when I used to lecture on this very subject, from this table, to an audience very much like what I see before me to-night. It is a great pleasure to me to find myself in old haunts and familiar places. You have heard a picturesque, well-informed, and graphic address. But what is the lesson that you and I ought to learn? It is this, that we have a real scientific frontier. There was a great statesman, for whom I have the utmost respect, who said that the frontier was unscientific. But for once he was wrong. Sir Thomas Holdich has shown us that the frontier is scientific as regards the geology, the plateaux, the plains, the natural barriers, the strategic points. Surely that is a scientific frontier, designed by nature herself, the great teacher of science. Nature understands these matters, or rather the Creator who made nature, far beyond any feeble ideas of ours. Of what does the frontier consist? One vast serrated wall with gates and doors here and there; and I will say to my countrymen, having a long acquaintance with the subject, that as long as you have command over these gates and doors, do not waste your resources, spend your money, and shed your blood in going beyond this wall.

My concluding words are these. All our frontier arrangements depend on our being friendly with Afghanistan. This is not an Indian, but a European question. As long as you have the friendship of Afghanistan and retain command over the almost impenetrable wall raised by nature as above described, you may depend on having skilled British officers with faithful and gallant Sepoys to defend the land which lies behind—that is, on the British side of the border.

Sir James Hills Johnes: I will not detain you long. I wish simply to tell you that I have come a long way to hear your excellent lecture, and I have been well repaid for having come. I do not know that I am in a position to carry much weight, because I retired years ago, but I must record my approval of your able paper. I have had the frontier question much in my thoughts, and what you have said to-night emphasizes my views. The great point that we must see to, is that we keep the friendship of the Ameer of Cabul. He has made Afghanistan a strong power, and it will be for our mutual benefit to be warm allies.

Dr. Blanford: There is no part of the interesting address from Sir Thomas Holdich more deserving of the attention of geographers than the intimate connection which he has shown to exist between the physical geography of the north-western frontier of India and its political, military, and commercial history. That physical geography is both remarkable and interesting, and is closely connected with the geological history of the Indian peninsula. In that wonderful work by Suess, 'Das Antlitz der Erde,' a book already in great part translated, and well translated, into French, but hitherto, I regret to say, not reproduced in English, there is a masterly summary of the subject, to which I should like to call the attention of all interested in physical geography. Very briefly the views expressed are the following:—

In the Mesozoic era of geology, at the time when the British oolites and chalk were being deposited, the land that now forms the peninsula of India was part of a continent, of which other surviving fragments are to be found in Madagascar and Southern Africa. A very large area in Central Asia, including part of the Tibetan plateau, now 15,000 to 20,000 feet above the sea-level, formed a great eastward extension of the Mediterranean. In early Tertiary times the sea still occupied a great part of South-Western Asia, including the Indian north-western frontier. Then changes set in, and from all directions pressure, caused by crust contraction or other agencies, was exerted against the resisting solid mass of India, and resulted in great crumpling of the rocks. The greatest pressure came from the northwards, and to this we owe the mass of the Himalayas, but other thrusts were exerted from the east and from the west, and resulted in the formation to the eastward of the ranges of Assam, Arrakan, and Burma, and to the westward of the mountains of our scientific frontier. So far as I have had an opportunity of investigating the physical features of the country, they agree with Suess's theories.

The results of the crumpling and folding of the rocks in late Tertiary and probably even in almost recent times, coupled with the denudation, especially of the softer beds, are to be seen in the parallel ridges of Afghanistan and Baluchistan. None of the mountains on the Indian frontier are of great geological antiquity. It is in conection with the late formation of the ranges that the river gorges which traverse them are especially interesting. Even the Himalayas are cut through by the Indus, Sutlej, and Brahmaputra, and also by some of the smaller rivers which form tributaries to the Ganges. In the same way, on a smaller scale, as Sir Thomas Holdich has pointed out, the Afghanistan and Baluchistan ranges are frequently cut through by streams of no great size or importance. Two remarkable cases are worth mentioning—one is the well-known Chappar rift, through which the railway runs

between Harnai and Quetta. Here all the drainage of the valleys around Kach and Kawás traverses the narrow gorge in the anticlinal range forming the northern side of the Harnai valley. The other is very little known, and is even more remarkable. The southern part of the Suliman range, south-west of Dera Ghazi Khan, terminates about 60 or 70 miles from that station in the neighbourhood of the Cháchar pass. A few miles to the north of this pass, where the range is at least 3000 feet high, it is cut through from west to east by a stream, the Kaha, which drains several hundreds of square miles to the westward of the range, and then, instead of making its way southward over fairly open country composed of soft rocks, it cuts through the hard sandstones of the Suliman range in a magnificent gorge, or what it is the fashion in these days to call a cañon, and debouches on the Indus plain about 50 miles south-west of Dera Ghazi Khan. There is no reason to attribute these gorges to fracture; in all the cases I have seen no evidence of dislocation or cracking can be traced. These wonderful chasms result from the slow but persistent action of the sand and gravel carried down by the streams; they are a magnificent effect of what have been termed "antecedent" rivers, and whether in the ravines of the Suliman or in the great valleys of the Himalayas, they bear witness to the same fact,—that the rivers which cut them are older than the mountains in which they are eroded.

Captain YOUNGHUSBAND: I should much have liked to engage in a political discussion on this question, but I think perhaps I had better confine myself to the scientific aspect of the lecture which has just been read. The point I should like to emphasize most is the great extremes which are to be noticed there, both in the climate and natural features of this country, and which are reflected in the character of the people themselves. The great extremes of climate, heat in summer and cold in winter, the rapid changes between day and night, winter and summer, are characteristic of the people, who are for ever in extremes. At one time you find them gay and jubilant, engaging in a game of polo, and talking to you in the most friendly way, and the next moment rising up against you without the slightest possible warning and without any apparent cause. This is characteristic not only of the Chitralis, but of most of the people of the frontier. It is due, I think, to the nature of the country and the climate.

I have been noticing lately the people of the Mohammedan state of Tonk, in Rajputana, who originally came from the frontier; they left Boner about 150 years ago, and formed part of the Rohilla bands who defeated the Mahratta and other chiefs of that period. But now, instead of being of a warlike, impressionable, and fiery character, I found them toned down into a mild and quiet people, and seemed to have lost all their manliness. I hope that in our future dealings with the frontier tribes we shall try to preserve this characteristic, but also take precautions that it may not be used against ourselves.

On the motion of Sir John Gordon, a cordial vote of thanks was passed to Sir Thomas Holdich for his paper.

TOPOGRAPHY OF SOUTH VICTORIA LAND (ANTARCTIC).*

By LOUIS BERNACCHI.

The conception of a great *terra Australis incognita* has been proved to be equally erroneous with the conjecture that no land whatever, or of only trifling extent, was to be found. It has been proved that extensive masses of land exist within the antarctic circle; but whether the land takes the form of a vast continent, or an archipelago of islands smothered under an overload of frozen snow which conceals their insularity, or islands whose shores are washed by the ocean, remains still an enigma, and a fascinating one to be solved by future expeditions. It is, I think, premature to call it "the Antarctic Continent," for explorations on the American side, and even on that of Australia, tend to prove the existence of a broken-up continuation of these two continents with the most extensive masses of land lying under their respective meridians.

The coasts of Wilkes Land and the Balleny islands appear to be a duplicate of the Australian coast, so the gigantic mountain range to which the coast of South Victoria Land rises seems to correspond to the mountain chain of New Zealand; while the volcanic extremity of the cordilleras of South America finds its counterpart in the broken and scattered island masses also bearing volcanoes to the south of Cape Horn. The prolongation of the volcanic ring, or "circle of fire," from New Zealand to Balleny islands, South Victoria Land, and right across to the American side, seems to support this theory. Prof. Arctowski, of the *Belgica* Expedition, has suggested that "Graham Land is connected with Patagonia by a submarine ridge, which forms a great arc extending between Cape Horn and the South Shetland islands, and that the tertiary chain of the Andes reappears in Graham Land."

Although, perhaps, the explorations of the *Southern Cross* have not thrown much light on this matter, the great mass of geological specimens collected might, if properly dealt with, assist very materially in arriving at a better knowledge of the conditions of things. The ship *Southern Cross* of the Newnes Expedition entered the antarctic ice-pack on the last day of the year 1898, and was nearly fifty days before penetrating to the ocean beyond, during which time she thrice crossed and recrossed the antarctic circle. This, with the exception of the *Belgica*, is the longest period a ship has ever been involved in that pack. Our long imprisonment was due to having entered it so far west, in long. 158° 53' E., where it is very dense and heavy.

On first entering, ice was visible to the horizon in the south and west, whilst in the east and south-east there was open water. Our

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* Read at the Royal Geographical Society, March 18, 1901.

experiences, and those of other expeditions, tend to prove that the ice-pack on the Australian side of the antarctic circle is not nearly so dense in an easterly as it is in a westerly direction. Ships that have entered the pack in about 170° E. long. have penetrated it in a few days, whilst those entering it between 150° and 165° E. have taken more than a month. There are numerous instances in the history of antarctic navigation which go to prove this. A strong cold surface current appears to set out from Ross sea in a north-westerly direction, driving the ice up northwards, between Kerguelen island and Australia. At Cape Adare huge bergs were often observed, during perfectly calm weather, travelling at about 4 knots an hour towards the north-west. The prevailing south-east winds are also a factor in driving the ice in that direction.

The sea-ice, which constitutes the bulk of the pack, is first formed by the freezing of the sea in the winter along the shores of the antarctic lands. This freezes to an average depth of from 4 to 5 feet, and extends out into the ocean for perhaps 50 miles, until the formation of an uninterrupted sheet of ice is prevented by its perpetual violent agitation. This ice begins to break up early in November, and move northwards, and by the middle of January the coasts are almost free. As this body of sea-ice moves towards the north, it is frequently driven back by northerly winds. Thus, in consequence of the circumstance that land lies to the south, which excludes the possibility of more sea-ice following in support, an open sea, comparatively free from ice, is met with in the antarctic regions almost regularly when the principal zone of pack-ice has been pierced. Serious danger from ice-pressure in the open pack is comparatively slight. Once, on January 24, a rather severe pressure set in during a gale from the E.S.E., when the *Southern Cross* was fast wedged in the ice. On the port side the blocks piled up to a height of nearly 15 feet, and on that side the ship was lifted 4 feet out of the water, but at no time were we anxious for her safety. The pack, very susceptible to a gale, drives before it, and so there is really no danger, for there is no resisting force. But woe betide a ship that ventures to winter near the coast, unless it be a well-sheltered inlet, for when a pressure sets in there, it piles the huge blocks of ice up on the shore to from 20 to 60 feet, and a ship would surely be crushed, no matter how strongly she may be built. A real source of danger, however, is a gale or a very heavy swell on the edge of the pack, when huge masses of ice crash into the sides of the ship with terrific force, causing the tall masts to quiver for some seconds after the shocks, or the mighty blocks grind in against the sides as they pass.

At noon on January 12, a faint grey light was sighted on the port bow. At one time it looked like a cloud, at another it had the appearance of land. Finally it proved to be land, and very high land too. Our latitude at the time was 65° 3′ S., and longitude 161° 43′ E.,

the land bearing S. 20° E. true, distant about 70 miles. The day was beautifully clear, and not a breath of air stirred a ripple on the glassy patches of water. The land was at first taken by the captain to be some undiscovered island. I went up into the crow's-nest to have a better look-out; the captain was there in a great state of excitement, so convinced was he that he had discovered new land. Most of us, however, were extremely sceptical and could not participate in his elation. It seemed improbable that such an able navigator as Sir James Ross, who actually went over the same ground, should have missed this discovery. When we perceived a dull volume of smoke rising from the east end of the land, undoubtedly the smoke of a volcano in activity, we decided it was one of the Balleny islands upon which Balleny mentions the presence of an active volcano. As we approached closer, the outline of the land became admirably clear and defined.

Owing to the abundance of light reflected from the white, glittering snow-clad surface, few shadows were cast on any part. Observed through the telescope, abundant detail could be made out. A vast mantle of snow descended to within 600 or 800 feet of the sea, and there ended abruptly. This snow-line was easily traced right along the land even with the naked eye. From the appearance of its edge, the snow-cap must have been some hundreds of feet thick. At the west extremity was a high truncated headland, and above this headland to the east was a peak some 10,000 feet high, with a large and apparently inactive crater at its summit. At the east end the land was comparatively low, and, from its blue appearance, at a great distance from us. It was from this part that the dark volumes of smoke issued at intervals. Low down in the eastern horizon were snow-clad pinnacles, only discernible by the aid of the telescope. Outwardly the land exhibited a naked, desolate appearance, a volcanic desert, covered with ice and snow, and so surrounded with ice ejected from the glaciers and forced on to the shores by the north-west current, that it is difficult, if not impossible, to examine the coast very closely. We approached to within 40 miles of the land, and then progress was completely stopped by huge blocks of ice, which had evidently only quite recently rolled down from the lofty peaks. We moored to a floe, and decided to wait until the ice opened up, and so allow the ship to approach closer to the shore. Plans were made for landing the next day, if possible, and it was intended to send a short sledge expedition into the interior to investigate the country. But the next day a gale arose, and the ship was compelled to steer northwards to more open water, as it was dangerous to remain in the vicinity of such heavy ice. A dense fog hung over the sea, completely blotting the land from sight; and so, as there appeared but little possibility of making land in that kind of weather, and there being no likelihood of it clearing, it was decided to abandon the idea and to proceed on our way to Cape

Adare. Thus all our nicely arranged plans made the day before were frustrated.

Towards the evening of January 28, the clouds, which for days had persistently obscured our horizon, lifted and disclosed to our eyes the rugged outline of a mountainous land to the south. Nothing could look more inhospitable. At this time (10 p.m.) the east extremity was bearing S. 26° E. true, and the west extremity S. 45° W. true. Our latitude at noon was 66° 46′ S., long. 165° 40′ E., and variation of compass 30° E.; the land at that time being distant about 40 miles. There is little doubt that the land we sighted was one of the Russel islands discovered by Sir James Ross in 1841. It has been suggested that the Balleny islands and the islands seen by Ross near them were identical. We have proved that they were groups quite apart. The Balleny islands were discovered on February 9, 1839, and consisted of three islands. The west cape of the middle island lay in lat. 66° 44′ S. and long. 163° 11′ E. Buckle island was in active eruption in two places when Balleny saw it. To the east of it lies Sturge island, which is cone shaped, whilst Young island is the largest and highest of the group. Ross's discovery lies more to the south-east. The position of Russel peak on Smyth island, according to Ross, was lat. 67° 28′ S. and long. 165° 30′ E., with which our observations agree. Those observations were very carefully taken in an artificial mercury horizon, placed on the surface of a large icefloe, by Lieut. Colbeck and myself. I have mentioned this in justice to Lieut. Colbeck, whose observations have evidently been miscopied from his original observation book, and have appeared in the recent publication, 'First on the Antarctic Continent,' in a somewhat quaint and unusual form.

The following day being fine, the land was plainly visible. It was not more than 40 miles from us, and was covered with vast piles of snow which never melts, and seems destined to last as long as the world holds together. At the east end of the island a high cape fell perpendicularly into the sea. The west end sloped up gradually from the water's edge to a lofty peak (Russel peak), which, as far as could be estimated, was 10,000 feet high, and, where not covered with snow, terminated in sharp and jagged ridges of a very dark colour. The whole range was of a serrated nature, and the snow-cap extended to the water's edge, whereas on the land we had sighted a few days back it did not. The whole of the north side presented to our view was precipitous, and in some places cliffs between 500 and 1000 feet high fell sheer into the sea; it would have been vain to attempt a landing.

On February 17, Cape Adare (lat. 71° 18′ S.) was reached, a cape of a very dark basaltic appearance, with scarcely any snow lying upon it, thus forming a strong contrast to the rest of the snow-covered coast. This lack of snow is principally due to the very exposed position of the cape to the south-east winds, and perhaps also to the steep and smooth

nature of its sides, which afford no hold for any snowfall. The most striking features of this new world were its stillness and deadness, and impassibility. No token of vitality anywhere; nothing to be seen on the steep sides of the mountains but rock and ice. Here and there enormous glaciers fell into the sea, the extremities of some many miles in width. Afterwards, when the mist had cleared away, more than a dozen were counted around Robertson bay. As we approached, the sounding-line was kept going, but there was deep water close in to the shore. Indeed, there is little danger of finding banks or outlying submerged rocks anywhere along the coast of South Victoria Land. The "Dunraven rocks," indicated on Ross's chart as lying off Cape Adare, and over which, Ross states, the seas were breaking when he observed them, apparently do not exist; for, although a most careful search was made for them during the twelve months we were at Cape Adare, they were never seen. If they exist, they could not have failed to betray their presence during boisterous weather. Could it have been a large rotten submerged mass of ice that Ross mistook for rocks? With the exception of one place where a pebbly bank could be seen, basaltic cliffs rose sheer out of the water to an average height of about 500 feet.

The place upon which we had landed was a triangular-shaped and undulating bank or platform of detritus, the centre of which was about 20 feet above the water-level, and the whole area some 180 acres. It was formed of rounded boulders, pebbles, gravel, and, near the mountain-side, angular masses of *débris*. How this bank first came to be formed is difficult to determine for one who is no geologist; possibly it is the result of glacier action of some kind, or is simply a raised beach. Many stones, however, are blown down from the summit of the cape by the furious winds which sweep over those regions all the year round. The alternate expansion and contraction caused by seasonal and rapid daily changes in temperature is the principal cause in disintegrating the cliffs. The vicissitudes in temperature during the year, more especially during the winter, are at times extreme and astonishing. We have witnessed, in the middle of winter, the temperature alter in a few hours from $-35°$ Fahr. to $+25°$ Fahr. Ice forming in the cavities of the rocks, at a few degrees below the freezing-point, exerts an enormous disruptive force. The volcanic rocks, being all porous, in the summer collect much moisture; when the temperature falls, they have their particles pushed asunder by the freezing of the interstitial water. The observed amount of destruction thus caused is enormous; large blocks of stone are split off and launched to the base of the declivities. Some measure of its magnitude in those regions may be seen in the heaps of angular rubbish at the foot of the crags and steep slopes all along the coast. There are many places where soil might form if it were not for the action of the winds, which blow all the finer disintegrated particles into the sea. The winds, blowing with cyclonic

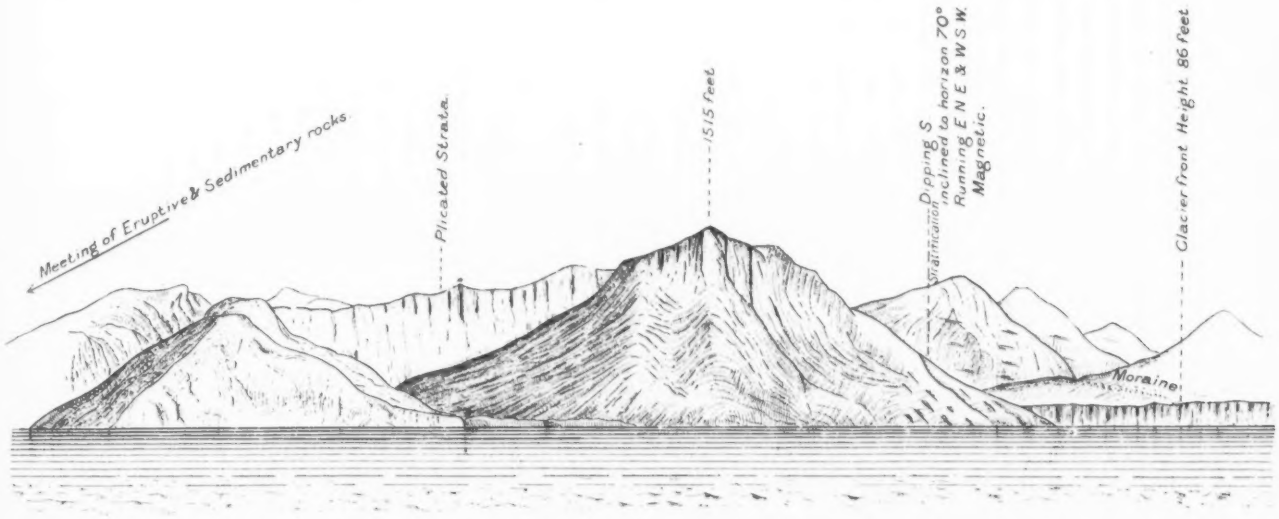
force, are so strong that loose rocks on the face of the cliff are hurled down, and blocks of stone and loose gravel swept away. Gravel and pebbles were heaped up in mounds and ridges. In some places these ridges coalesced so as to enclose basin-shaped hollows, that were filled with strong-smelling liquid matter, which, in the winter, froze solid. Some of these hollows were more than 100 yards in diameter. Bleached remains of thousands of penguins were scattered all over the platform, mostly young birds that had succumbed to the severity of climate. Thousands of years hence, if the species should become extinct, those remains, frozen and buried among the *débris*, will be available as a proof of what once existed in those gelid regions, now just habitable, then, perhaps, not at all. That same night Mr. Evans and I climbed to the summit of Cape Adare (850 feet by aneroid). By following a ridge of craggy rocks we found the climbing tolerably easy, and reached the top in less than an hour. The scene before us looked inexpressibly desolate. A more barren desert can scarcely be conceived, but one of immense interest from a geological point of view. From the end of the cape to the foot of the mountain beyond, a great waste of hollows and ridges lay before our eyes—ridges rising beyond ridges like ocean waves whose tumult had been suddenly frozen into stone. Beds of snow and ice filled up some of these extensive hollows, which had been scooped out by glacier action. Innumerable large erratic boulders lay scattered about, which had, no doubt, been transported to their present positions by the ice-sheets from places many miles away. One huge boulder, which rested on the outer edge of a great basin scooped out of the volcanic rock, was of grey granite, and about 10 feet in girth; some other boulders were of a green formation resembling diorite. In the eroded beds, and among the *débris*, we found numerous pieces of quartz with bluish streaks running through them. I was especially struck by its resemblance to some auriferous quartz met with in Australia. We also picked up pieces of pink and red granite, and a hard greyish stone of the consistency of flint.

I wish to refer here to a statement made after the return from the south polar seas of the whaling ship *Antarctic* in 1895, to the effect that "the intercalation of lava and ice had been observed at Cape Adare, and that in one place the lava-flow appeared quite fresh." This statement has been very widely accepted as authentic. Sir Archibald Geikie has referred to it in numerous geological papers, more especially in his address before the Antarctic Congress in 1898. Dr. Karl Fricker also makes mention of it in his work on the antarctic regions. Unfortunately, the statement is absolutely without foundation, for there is no sign of the intercalation of lava and ice in the old eruptive formation at Cape Adare, nor anywhere else along the coasts of South Victoria Land, unless it be in the vicinity of Mount Erebus.

As we are dealing here exclusively with the topography of the

antarctic lands, I will pass over everything which is not related to the subject. On August 14, 1899, a sledge party set out from the hut at Cape Adare for the purpose of exploring the southern extremity of Robertson bay. No doubt it would have proved more valuable and interesting to have investigated the shore-line in the direction of Smith's inlet and Cape North, and examined closely the whole contour, which might have yielded geographical and geological discoveries of much value. Besides this, the accurate astronomical positions of headlands, inlets, glaciers, etc., could have been laid down, and soundings taken through the numerous open seal-holes. We reached what we thought to be our destination very late at night, and camped between two walls of ice. These walls of ice puzzled us considerably, and it was not until the following morning, when we had climbed to the summit of one of these barriers and were able to get a view of our surroundings, that we discovered we had steered a wrong course during the previous night, and, in the darkness, had run into a kind of inlet between two huge tongues of ice 5 or 6 miles further down the coast—a veritable *cul-de-sac*. These tongues of ice, which were the seaward prolongation of two great rivers of compact crystalline ice creeping down from the deep mantle of snow and ice enveloping that polar land, extended out into the bay for a distance of 3 miles, and were, perhaps, half a mile broad. Two glaciers traversing convergent valleys united at a point about 6 miles above one of these tongues, and the lateral moraine stuff, which could be easily traced on one side of each, coalesced and formed a broad and conspicuous medial moraine down the centre. Much of the moraine rubbish, however, was concealed by the loose snow on the surface. I measured the height of the ice-ramparts in several places by carefully marking out a base-line on the frozen surface of the sea, and observing the angles of elevation with the sextant; the average height was about 90 feet. Of course the icebergs formed in Robertson bay do not attain anything like the dimensions of those drifting up from farther south, where the glaciation is so much greater. On the lee side of the ice-tongues great piles of snow-drift were accumulated by the east-south-east winds, and heaped up almost on a level with the summit of the wall. The sea-ice around the extremities of the tongues was very little cracked or crushed together, thus indicating that the movement of the glaciers was not, at that time of the year, very considerable.

The glaciers of the antarctic do not, I think, move rapidly at any time of the year. In this respect they are very different to those of Greenland, some of which, I believe, are the most rapid moving glaciers on the surface of the globe. No actual measurements on the rate of motion of the glaciers of South Victoria Land have been made, so that nothing positive respecting them can be advanced. Sharp detonations, however, were frequently heard, showing that there was some movement going on in the mass.



SKETCH OF LOCALITY IN SOUTH END OF ROBERTSON BAY, WHERE SLATE FORMATION BEGINS.

The spot where we ultimately camped was a small islet, which has been named Duke of York island, and which is, perhaps, 3 miles in circumference, and surrounded by a glacier that nearly conceals its insularity. The geological formation consists of a greenish slatey rock of very fissile structure, which is on the whole intensely crumpled and plicated. Crystals of pyrites occurred disseminated throughout the formation, in some places in great abundance. The pyrites appeared in small cubical perfectly opaque crystals, which, with reflected light, showed the characteristic brassy lustre of the mineral. These crystals appeared to yield but slowly to weathering, for generally the cubical crystal could be seen projecting still fresh from the stone, which had no doubt been long exposed to the atmosphere, and a small blow would, in many cases, loosen the entire crystal from the rock. The formation was here and there traversed by thick veins and narrow threads of quartz, showing strong evidence of disturbance, and seemed to have been exposed to a powerful lateral pressure; this quartz contained bluish and rusty-coloured streaks. In the crevices of the slate rock a dark soft soapy substance something like graphite was found. In some places the stratification formed roads on the side of the mountain some 30 or 40 feet in width; in other places the greenish colour of the formation was changed to a dull brick-red, as if it had been under the influence of heat. Whether this is really caused by heat or is merely the ordinary effect of weathering, I do not know; I think the latter cause is the most probable. These red patches were conspicuous some miles away, and were exactly similar to the formation around them, and, relatively, in no way disturbed. The slatey formation extended as far north along the coast as we examined, which was about 5 miles, the general inclination of the stratification being about 60°, and dipping south. How interesting, from a geological point, it would have been to follow the formation round towards Cape North!

At a place about 2 miles south of the islet, and right in the bottom of Robertson bay, a dark eruptive rock of very great density and very hard flowed over the sedimentary formation, and thus completely hid from view its southern prolongation. It probably continues underneath the lava-flows towards Mount Erebus. At Wood bay it will probably be found outcropping again on the surface. This sedimentary formation is of immense interest; it appears to continue north towards Wilkes Land, for Dumont D'Urville found slate rock at the place where he landed in the neighbourhood of "Pointe Géologie," and it possibly underlies most of the volcanic rock of the antarctic lands. This slate formation also appears among the islands south of Cape Horn. The geology of the antarctic is a subject replete with interest for the connoisseur. In the extensive sedimentary deposits fossils might be found with indications of a warmer climate during some former epoch.

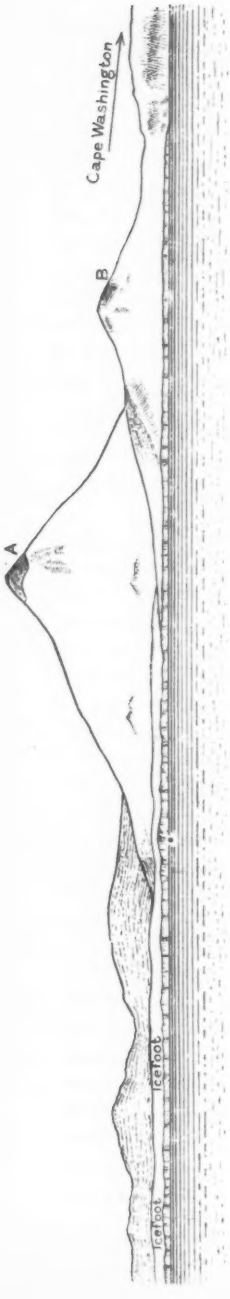
An attempt made at this time to cross the mountain range was

unsuccessful. Indeed, it became evident, soon after our landing at Cape Adare, that any attempt to penetrate far into the interior would be futile, owing to the rugged and precipitous nature of the mountains which had to be crossed before reaching the inland ice visible beyond. The Admiralty range of mountains in Robertson bay is the most formidable range in South Victoria Land. Rising to an average height of about 7000 feet, and partly free of snow on its northern slopes, it presents an impassable barrier to a sledge-party. The greatest altitude we succeeded in reaching was 5200 feet, a little to the south of Cape Adare.

On January 28, 1900, the *Southern Cross* returned to Cape Adare, and on February 2 we were all on board and steaming southwards along the coast. The coast-line from Cape Adare to Cape Downshire is exactly similar to that of the north shore of Robertson bay; the same igneous formation, with precipitous cliffs, and here and there pillars of rock standing out a short distance from the shore.

Early on the following morning a landing was effected on a rough pebbly beach on the western side of Possession island. This island, which is the largest of a small group, is low—the highest part, a peculiar abrupt bluff on the south side, being about 300 feet high It is almost entirely covered with a snow-cap averaging from 1 foot to 20 feet in thickness, and the whole island is, I should say, about 4 miles in circumference. Many large rocks were observed to the south of the larger island, two being basaltic pillars rising sheer out of the sea and attaining a height of about 100 feet. In another rock the sea had perforated three arches, one so large as to almost admit the passage of the ship. Towards noon we were off Cape Rogel. A large body of ice lay off it and at the mouth of Mowbray bay, so we were compelled to make a long *détour* towards the east to avoid it. In the afternoon Capes Christie, Cotter, and Hallet were passed, all bold rugged headlands of volcanic formation, and partly free of snow.

Coulman island was reached on the 4th. The shore on the western side looked so precipitous, that at first we entertained but little hope of effecting a landing. At one place a perpendicular cliff, some 1500 feet high, fell sheer into the sea; to the right and left were the walls of the ice-cap, about 100 feet high, and extending for some distance out into the sea. After some risky manœuvring in the surf, we succeeded in landing at a spot at the base of the cliff. There was, however, nothing to see except the walls of the cliff, the formation of which is volcanic and similar to that at Cape Adare. On the mainland, about 14 miles due west of Coulman island, we discovered a kind of inlet or arm running into the glacier for a distance of about 3 miles. This spot was well sheltered from winds, and from it the inland ice-cap was easily accessible; but it was scarcely safe for a ship, on account of the heavy ice-pack, which is borne by the current into the channel between Coulman island and the mainland.



SOUTH SLOPE OF MOUNT MELBOURNE, SHOWING WHERE ICEFOOT, CONNECTED WITH MCMURDO BAY, BEGINS.
A, Mount Melbourne, 8000 feet high; B, Pyramidal Mount, 2000 feet.

At noon on February 6, Mount Melbourne was sighted to the west-south-west. We were all struck by its extraordinary resemblance to Mount Etna. Rising up gradually out of the sea to an altitude of nearly 8000 feet, with a canopy of cloud upon its peak, it presented an imposing sight. All afternoon we steamed down Wood bay, which runs much farther inland than indicated on Ross's chart; at the bottom of it there is a long inlet or fjord, affording a capital harbour. Late in the evening, we landed on a pebbly beach at the foot of Mount Melbourne. The place upon which we landed was a pebbly bank even larger in extent than that at Cape Adare, entirely free from snow and "ponds" and occupied by penguins and skua gulls. A better spot for winter quarters, I think it would be difficult, if not impossible, to find in those latitudes. It is the only place in South Victoria Land where a ship can winter with perfect security. From here there is quite an easy access to the great snow-cap, not more than 100 feet to climb, and a very gradual gradient. This part of the coast is actually the closest approach to the south magnetic pole, it lying in an almost westerly direction from Wood bay distant between 200 and 300 miles. I do not, however, wish to imply that observations can be taken in the vicinity of the magnetic pole without much difficulty, for it is quite within the bounds of possibility that an open sea may be encountered before reaching a distance of 200 miles in a true westerly direction—that is, if an archipelago of islands exists, instead of a vast continental area.

If a land party should winter near Mount Erebus and Terror, there is an easy way of communication between such a party and a ship wintering in Wood bay by means of an uninterrupted ice-foot, which, commencing from the southern slopes of Mount Melbourne, continues southwards as far as McMurdo bay. The surface of this ice-foot is perfectly level,

covered with hard compact snow, and is but little crevassed, as was actually determined by two landings upon its surface in the vicinity of Cape Gauss, which is itself buried in the ice-sheet.

The distance between McMurdo bay and Wood bay is about 170 miles, which, with sledges and dogs, and such favourable conditions of ice-travelling, could be covered in eight days. The surface of this ice-foot is easily reached from Wood bay by going round the foot of Mount Melbourne from behind. The geological formation here was volcanic, but not compact or magnetic rock. It consisted mostly of scoriæ, no doubt ejected from Mount Melbourne, which, most probably, was at one time a volcano in activity. Some pieces of slate were seen on the beach, but, being engaged in taking magnetic observations, I had no time to search for any outcrop of this formation. The observed height of Mount Melbourne is 7200 feet. It is entirely snow-clad, and rises directly from the sea. The bare rocks at the foot of the mountain have weathered into many fantastic shapes.

On February 9, we landed without difficulty on the western side of Franklin island, on a pebbly bank similar to that in Wood bay and at Cape Adare. The whole island is of volcanic formation, one heavy greenish vitreous rock being especially interesting. From Franklin island we steered straight for Mount Terror, without approaching McMurdo bay, a close examination of which would have been of much value, for possibly there is a spot on its shores where a party might be able to winter; but the discovery of a sheltered inlet where a ship could safely winter is, I think, extremely improbable. On the 10th we sighted Cape Crozier and Cape Bird and the foot of Mount Erebus and Terror, but the dense masses of clouds wholly obscured all but the immediate coast-line. At the foot of Mount Terror we lay to for some hours in the hope of getting a glimpse of the summit of Mount Erebus, and procuring a photograph. But as the pall of clouds showed no sign of breaking, we waited no longer, and steamed on towards Cape Crozier, which we passed a little before midnight. I must mention, however, that on the afternoon of the following day the mist lifted for a short time, and enabled us to see Mount Erebus from the deck. Smoke could be easily distinguished arising from its snow-clad summit, so that it was evidently not quiescent; but whether it was in a state of eruption, as at the time of the visit of Sir James Ross, we could not distinguish, being too far away. It was a most cursory and imperfect glance that we got, for the dense mist soon closed down again. The light was too bad and the distance too great to procure a photograph of the volcano.

Soon after passing Cape Crozier, the mist rose from Mount Terror, and we obtained a fairly good view of it from base to summit. It is, of course, very lofty, but scarcely looks the height (10,884 feet) that Ross assigns to it. Strange to say, its eastern side was almost free from snow, and on the same side were numerous knolls, some having crater

mouths, and which at one time were the monticules of the parent volcano, now apparently extinct. Even stranger than the absence of snow on Mount Terror was the presence of an exceedingly large penguin rookery at its foot. This rookery was occupied by millions of penguins, and was far and away larger than any we had previously seen.

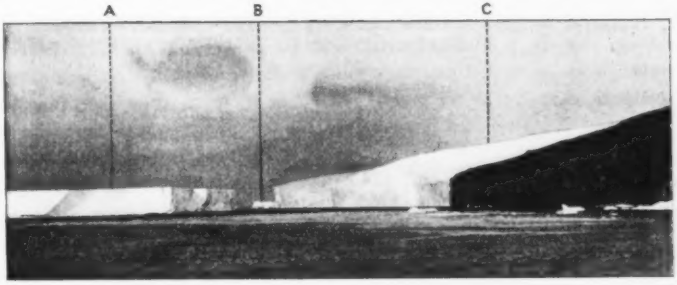
The foot of Mount Terror is low, and at the spot occupied by the penguins there is a kind of miniature plateau upon which a party could possibly spend a winter, although, I believe, it would be an extremely severe one. One of the greatest difficulties, if not the greatest, would be the excessive cold to be contended with, for even in the middle of summer, with a wind from the south, the temperature sinks considerably below zero; thus, on February 19, with a light wind from the south, the temperature fell to $-12°{\cdot}5$ Fahr. What, then, must we expect in the depths of winter with the wind from the same direction?

After having passed Cape Crozier, Ross's great ice-barrier came in view, stretching away out of sight towards the east. Scarcely any natural feature of the antarctic world has so stirred the imagination and so roused scientific interest as the discovery of this great ice-barrier. The most surprising characteristics of the great ice-barrier are its unbroken uniformity, its vast extent, and the entire absence of visible land from its edge. Imagine a perpendicular wall of ice, from 100 to 200 feet high, suddenly rising up before you out of the ocean, where the depth of that ocean is measured by hundreds of fathoms, and hundreds of miles distant from any visible land, for you soon lose sight of Cape Crozier and Mount Terror. There are no breaks in this wall, and it is very little water-worn, proving the rare occurrence of gales from the north and the accompanying high seas, which would otherwise wear huge caves into it; its summit affords absolutely no obstacle for travelling with sledges and dogs, being smooth and level and but little crevassed.

A theory has been advanced and very widely accepted that the great ice-barrier is the front of a huge polar ice-cap, which moves from the south pole northwards. It has even been calculated that the centre of this polar ice-cap must be 3 miles, and may be 12 miles deep, and that the material of this ice-mass being viscous, its base must spread out under the crushing pressure of the weight of its centre, and the extrusive movement thus set up is supposed to thrust the ice-cliffs off the land at a considerable rate. The improbability of this theory is evident to any one who has carefully observed the barrier and the ice-caps of that part of the antarctic, none of which can possibly be more than 2000 feet in depth. The following theory with regard to the formation of the great ice-barrier I hope may bear logical scrutiny.

In the first place, reasoning from analogy, all the ice-sheets of South Victoria Land, due to the north and south trend of the lofty mountain ranges, flow towards the east, and the glaciers extend for long distances

into the sea in the form of huge tongues of ice, their length varying according to the extent of glaciation due to differences of latitude. Thus, in Robertson bay (lat. 71° 18′ S.), some run out into the sea for a distance of 3 miles, and are half a mile in width; whilst near Cape Gauss (lat. 76° S.) they extend as far out as 30 miles, and are 4 or 5 miles across. These tongues of ice are characteristic of every glacier. Why should the great ice-barrier be an exception? The huge Parry range of mountains runs parallel with the coast, and appears to be simply a continuation of the coast-line, for there is absolutely no land in sight to the east of them. It follows that the ice-sheet, which covers these mountains and where the glaciation attains its maximum dimensions, must flow eastwards in the same direction as it does a few miles to the north of them. If the ice flowed northwards from the south pole, the ice-barrier near Cape Crozier would extend out into the sea, just as do



CAPE CROZIER, LAT. 77° 25′ S., LONG. 169° 10′ E.
A, iceberg; B, height nearly 200 feet; C, Crozier and the great ice-barrier.

all the glaciers of South Victoria Land; but this is not so. The edge of the barrier is at least half a mile behind Cape Crozier. Again, the surface of the ice-sheet would gradually rise from the edge towards the south. It does not, but rises from the east towards the west. Then it is evident that the great ice-barrier moves from the west towards the east. Therefore it appears as if the great ice-barrier is nothing more than a huge tongue of ice flowing eastwards into the ocean for a distance of perhaps 500 miles, and is possibly not more than 50 miles in width; so that, if the party from the *Southern Cross*, that landed on the barrier in lat. 78° 34′ S. and long. 164° 32′ W., on February 17, 1900, had continued their journey farther south, they might have come to an open sea on the other side.

The heavy ice-pack met with near this spot tends to prove the existence of a considerable track of ocean to the south, whose frozen surface only breaks up late in the year and moves out and around the extremity of the great ice-tongue or barrier in the usual north-westerly direction. If an extensive land area were behind, or farther east, such

a large mass of sea-ice would be impossible. Sir James Ross reported the "appearance of land to the south," near the spot where we landed on the barrier. We did not, however, sight any land, although we had exceptionally fine clear weather. I do not wish to imply that it does not exist, possibly it does, and is either an island or the eastern shore of a large deep bight extending from Mount Terror around towards Graham Land; but I do believe that there is an open sea between the southern side of the great ice-barrier and that land, if it exists.

There is one thing that appears to go against the above theory, and that is the comparatively shallow water found at the spot where we landed on the barrier, viz. 350 fathoms. But can we reasonably expect to find deep water near the south pole, where everything tends to prove the existence of an archipelago of large islands? The few indications which we possess of the depth of the ocean in this part of the world, seem to indicate that there is a gradual shoaling of the ocean from very deep water towards the antarctic lands. The ice-barrier in long. 164° W. is distinctly different in appearance to that observed further west. Its outlines were more broken and full of indentations; the elevation, too, was no more than 60 or 80 feet. The fact that the position of the ice-barrier where we landed upon it was found to be many miles further south than reported by Ross is possibly due to a large portion of the barrier having here broken off and drifted away in the form of huge icebergs. Or, again, Ross might not have approached the barrier very closely at this particular spot, his highest south point being 30 miles more to the east.

Before the reading of the paper, the PRESIDENT said: I think I can promise you a very interesting paper from Mr. Bernacchi. He is a young independent observer, and I think a very shrewd observer, and he has had the great advantage of observing in a most interesting part of the antarctic regions which has not previously been visited for nearly sixty years. I will ask Mr. Bernacchi to read his paper on the Topography of South Victoria Land.

After the reading of the paper, the PRESIDENT said: In introducing Mr. Bernacchi, I forgot to mention what I had promised to state, namely, that the reading of Mr. Bernacchi's paper had the full consent of his former chief, Mr. Borchgrevink. We hope that Sir Joseph Hooker may be disposed to make some remarks on the views expressed by Mr. Bernacchi.

Sir JOSEPH HOOKER: I have listened with very great pleasure to this most interesting and clear account of Mr. Bernacchi's of the phenomena that he has witnessed in the antarctic seas and lands. So far as my very vivid recollection carries me, they precisely agree with what I saw myself now upwards of sixty years ago, put in a very clear and most instructive manner. Of course, the great interest of the voyage and observations is that great ice-barrier. That ice-barrier, I think I may safely say, presents the most remarkable unsolved glacial problem in the world, and there has been really no satisfactory explanation given of it. That which Mr. Bernacchi has put forward, which he very wisely regards as a mere speculation, is a very ingenious one, and it may be a true one, but it is exceedingly difficult to conceive any amount of *névé* in the

Parry mountains driving a body of ice of that dimension over 300 miles. It is practically a plane surface, and we know nothing like it in any other part of the world. Then, again, with regard to there being water on the southern slopes of this barrier, is it not a fact that on no occasion did Mr. Borchgrevink see anything like a water-blink in the sky in that direction? If there had been much water within any reasonable distance to the southward, I think we could not fail to perceive a water-blink in the sky. These are the only remarks I have to make.

The PRESIDENT: Mr. Bernacchi allows about 50 miles of width.

Sir JOSEPH HOOKER: Yes. I should like to ask Mr. Bernacchi if Mr. Borchgrevink's party saw any appearance of these mountains seen by Ross from the extreme eastern edge of the barrier?

Mr. BERNACCHI: No, none at all.

The PRESIDENT: Were you as far east as Ross?

Mr. BERNACCHI: No; within 30 miles of Ross.

Dr. BLANFORD: I have not had time to look at the geological specimens exhibited by Mr. Bernacchi; but the additional facts that have been obtained concerning sedimentary rocks and their resemblance to some of the Australian rocks are very interesting, and will lead to further identification. Of course, the most interesting fact about the antarctic land area is the probability that this at one time has formed part of either South America or Australia, or probably of both; because if it was not land at one time, and land which was not entirely covered with ice, it is very difficult to understand how some curious connections between the animal life of South America and Australia can have originated. The fact that one of the great groups into which the marsupials are divided is only represented in South America and Australia, is in itself extraordinary; and it appears, from some recent observations, that the number of South American forms allied to the Australian marsupials is much greater than we in past times supposed. Then another curious fact is with regard to the horned tortoise *Miolania*, of which remains have only been found in Australia and South America. There are other points of connection in past times, and there is quite sufficient similarity between the faunas of the two areas to make it highly probable that at one time, when, perhaps, the southern hemisphere contained more land than it does at present, and the northern contained less, there was land union between South America and Australia. I think that the interest attaching to the glaciers and the ice-barrier is also a geological question. Just as one of the most important discoveries of the century was made when Nordenskiold penetrated into the interior of Greenland, so I think it is very probable that some equally important discoveries remain to be made when we know something of the interior of the antarctic land. Whether it is a continent or merely an archipelago of large islands, is one of the questions that remain to be solved in the antarctic area, and the exceedingly novel and interesting views which Mr. Bernacchi has brought before us about that enormous mass of ice throw an entirely new light upon the whole subject. The ice may be either the edge of a great glacier coming down from the land to the south; or it may be, as Mr. Bernacchi has suggested, a mass of glacier ice pushed out to sea, or it may be a mass of floating ice filling a sound between two large islands. It is very satisfactory to hear that it can be easily explored; and if it can be penetrated from 150 to 200 miles, it will at once be shown what its real nature is. If it is a glacier, the surface will rise rapidly towards the south; if it is a floating mass pushed off from the land, the surface will not rise rapidly, but will probably remain for a considerable distance very nearly at the same level.

Admiral Sir GEORGE NARES: With regard to Robertson bay, we are told of a remarkable double tongue of compact crystallized ice. Can Mr. Bernacchi tell us, was that likely to have been a summer river either at the spot or further back, and that it has been pushed forward by the glaciers?

Mr. BERNACCHI: No, I do not think so.

Admiral Sir LEOPOLD M'CLINTOCK: May I ask the lecturer if he would kindly give us some information of the animal life to be found far south, as it is very important to know whether food could be obtained for men or dogs who might have to pass the winter there. You mentioned penguins, but I take it they only visit the coast in the summer season?

Sir ERASMUS OMMANNEY: I should like to ask whether you made any exploration along the coast to the westward of Cape North, or did you see beyond that anything like the ice-barrier which was observed to the eastward? I presume the exploration of the coast was made under sea navigation, wasn't it?

Mr. BERNACCHI: Yes, most of it.

Sir ERASMUS OMMANNEY: Did you make any use of the dogs?

Mr. BERNACCHI: Oh yes, in Robertson bay only. In reply to a remark of Sir Joseph Hooker with regard to the Parry mountains, I may say the snow-cap on the mountains is, I think, sufficient to force such a large mass of ice as the great ice-barrier towards the sea. We must remember that there are no slopes to the west of the mountain ranges in South Victoria Land, that there are only slopes to the east, and that there is a large body of snow and ice moving from the west right over the summits of the mountains, so that that would be quite sufficient to force a large mass of ice eastwards. Then, in reply to a question put by Admiral Sir Leopold M'Clintock, of course I am not very conversant with zoology or with animal life, but I can say there are no land animals to be found in South Victoria Land; but there are plenty of seals along the shore-line, both in summer time and winter, and they are always available as food for dogs and human beings, and the penguins, which can be procured during four months of the year, are also available as food for sledge-parties. And then I think Sir Erasmus Ommaney asked a question with regard to explorations in the direction of Cape North. I am very sorry to say that no expeditions were undertaken towards Cape North. I do not know for what reason. The commander was requested to allow permission to undertake expeditions to Cape North by various members of his staff, but for some reason he did not grant that permission. There is no doubt we could have undertaken these expeditions, because the surface of the ice was not hummocky in that direction, and was perfectly secure, and remained so until late in December. And then with regard to an ice-barrier to the west of Cape North, of course I have not seen the barrier, and know absolutely nothing about it, but I believe the barrier was seen by Wilkes and Dumont d'Urville. In the first place, I think some of Wilkes' ice-barriers and lands are extremely improbable. Sir James Ross has proved that some of his lands did not exist, so also did the expedition of the *Challenger*. Of course Dumont d'Urville was more reliable, and there is no doubt there is an ice-barrier from Cape North westward, and I believe the length of it is about 90 miles. We can account for that in the same way as we can account for the great ice-barrier, for I believe most of the mountain ranges seen by Dumont d'Urville run north and south, not east and west, and appear to be a continuation of the Australian continent, for nearly all the mountain ranges in Australia and New Zealand run north and south. And then the same theory of the ice-tongue moving from the mountain slopes would apply to that ice-barrier, as it does to the great ice-barrier. Of course, there is no doubt that a very large field for exploration still remains in the antarctic regions, and the expeditions of the *Southern*

Cross and the *Belgica* have not added very much to our actual geographical knowledge of these regions. The expeditions which are about to sail from England and Germany have a field for exploration greater than the whole of Australia, and the scientific results which would accrue from the exploration of so extensive and unknown a polar track must be very great; and surely we cannot boast of any brighter chaplet than that which has been gained in the field of scientific and geographical research. Explorations in the antarctic can have little commercial value, for a more barren spot could scarcely be conceived. As for gold—well, in the first place, you have got to find it, a most unenviable task, and you would fully deserve it if you were successful. But I do not think any rational-minded person would for a moment entertain so wild and picturesque an idea as that of discovering a second Eldorado in South Victoria Land.

The PRESIDENT: There were glittering stones, were there not?

Mr. BERNACCHI: Yes, but I don't think it was gold. Nor would the most ardent advocate of imperial expansion look to the territory surrounding Mounts Erebus and Terror as a sphere for his ideas.

The PRESIDENT: I think I may congratulate the meeting on having listened to an extremely interesting paper, and also an important paper from a geographical point of view. In the first place, the lecturer appears to have cleared up the question respecting the difference between Russel islands and Balleny islands. Then he has given us a clearer description of Robertson bay and Cape Adare and Duke of York island than we had previously received. His description of the excellent winter quarters in Wood bay is important. And it must be very gratifying to Mr. Bernacchi to find that his theory respecting the great ice-barrier has received the attention of Sir Joseph Hooker and Dr. Blanford, who have both expressed, at all events, their very great interest in it. I am sure you will all cordially pass a vote of thanks to Mr. Bernacchi for his very interesting paper.

SURVEY OF THE SOBAT REGION.*

By Major H. H. AUSTIN, D.S.O., R.E.

IN the autumn of 1899 two survey parties left England for the Sudan, with the object of surveying (1) a tract of country from Roseires on the Blue Nile, in a southerly direction down to the Sobat or Baro river; and (2) the Sobat river and the country lying between it and the north of Lake Rudolf.

The former survey party was under the command of Major C. W. Gwynn, D.S.O., R.E., who was accompanied by Lieut. L. C. Jackson, R.E., whilst the latter survey was entrusted to me, assisted by Major R. G. T. Bright, of the Rifle Brigade.

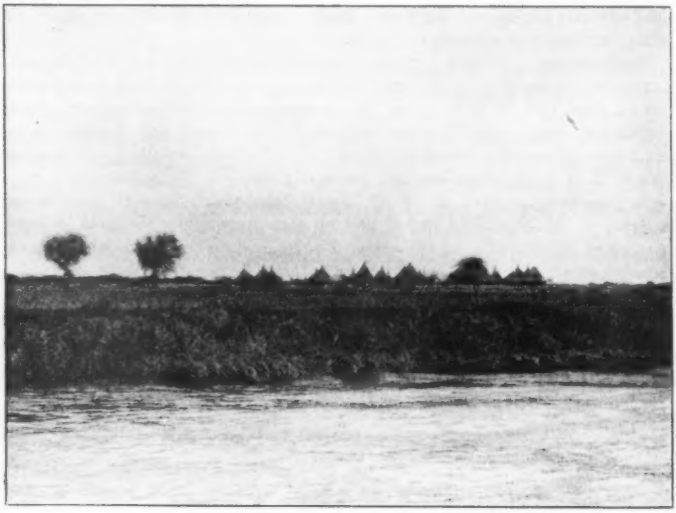
Major Gwynn and Lieut. Jackson accomplished a most successful and interesting journey, and accurately surveyed tracts of country hitherto but little known, as they entered regions never before visited by Europeans.

I do not propose, in this paper, to deal with Major Gwynn's

* Read at the Royal Geographical Society, March 25, 1901. Map, p. 572.

expedition, as I hope, on his return to England, he may be prevailed upon to give some account himself to the Society of the most valuable geographical results obtained by him and Lieut. Jackson. I shall merely confine myself, therefore, to giving a brief outline of the work done by Major Bright and myself, with some notes on the country passed through by us and the natives met with.

We left Omdurman at the beginning of December, 1899, in one of the Sudan gunboats, which towed a double-decked barge and two sailing-boats, in which were accommodated our escort of 22 Sudanese and 25 animal attendants, as well as the whole of our transport, consisting of 7 camels, 10 mules, and 130 donkeys. We proceeded up the White



NUER VILLAGE ON RIVER SOBAT.
(*Photo by Major R. G. T. Bright.*)

Nile past Fashoda, until we reached Sobat Fort, at the junction of the Sobat with the White Nile. We then steamed up the former river until we reached a point beyond which we were unable to proceed owing to the lowness of the river at that time of the year, and there disembarked—about midway between the Sobat and Nasser posts. As the transport animals had been confined on board for close on three weeks, and had lost condition considerably, we halted for a week at the point of disembarkation (near the village of Ashel), in order to admit of their picking up strength, and during this time the loads, etc., were packed into their saddles and all arrangements completed for the land journey. The course of the Sobat from Sobat Fort to the

BLUE NILE EMERGING FROM ABYSSINIAN HILLS, 20 MILES EAST OF FAMAKA.
(*Photo by Major C. W. Gwynn.*)

point of disembarkation was surveyed from the steamer, and the traverse thus obtained fitted in between points fixed astronomically when the steamer was tied up for the night. In this portion of the river only one tributary joins the Sobat. This is known as Khor Filus, and enters the south or left bank of the river some 10 or 11 miles above Sobat Fort. It is some 30 to 40 yards in width, and is said to be merely a loop of the river, the exit from the Sobat being near the village of Nyangdeng, which we crossed subsequently during the land journey.

Ashel is the first village of a small section of the Nyuak or Anuak tribe, who inhabit the river-bank as far as Wegin, whence the powerful Nuer tribe occupy both banks of the river as far east as about E. 34° 10′, thus separating the two sections of the Nyuaks.

From Sobat Fort as far as Amajok village, both banks of the river are inhabited by Shilluks. The Dinkas then intervene between the Shilluks and Nyuaks, numerous villages existing along the river throughout Shilluk and Dinka territory as far as the village of Lajak, after which come some 15 to 20 miles of uninhabited country along the river until Ashel is reached. The Dinka territory for the most part consists of open treeless grass plain; but the natives appear rich in herds of cattle, and possess numerous flocks of goats and sheep.

The disembarkation camp near a single Dom palm tree on the left

bank of the river Sobat was abandoned on December 28, and the land journey commenced to Nasser Post, which was reached on January 4, 1900. The country traversed along the left bank was generally well wooded and thickly populated, more especially in the Nuer territory, where tracts of fine park-like country were crossed, as well as large areas of cultivation in the immediate vicinity of the numerous villages. The inhabitants are, however, very low types of humanity, and although their huts and villages are well-made and substantial, the people themselves are indolent, suspicious, and depraved, and yet by no means unfriendly. Physically the men are tall and well-made, and have a high reputation for courage amongst the other tribes. They are all stark naked, and, as protection against cold, smear themselves from head to foot with wood-ash, which gives them a particularly filthy appearance. They are all well armed with spears, of which every man carries two or three in addition to a knobkerry, whilst their weapon of defence consists of an oval-shaped buffalo-hide shield. The elder married women are as filthy in appearance as the men; but all wear a leather apron or skin fastened round their waists. The girls and unmarried women do not, as a rule, smear themselves with wood ash, but, like the men, are quite naked.

Shortly before reaching Nasser another large khor is crossed on the south bank near the village of Tolor. This is reported to be the Khor Geni, which flows out of the Pibor river, some $6\frac{1}{2}$ miles below the

GOMASHA PLATEAU, LOOKING NORTH TO THE LARGER OF THE TWO GULE PEAKS.

(Photo by Major C. W. Gwynn.)

junction of the Akobo river with the Pibor, thus forming another loop. These loops are, I think, one of the most curious features of the whole of the Sobat region, and a glance at the map will show what strange and unlooked-for courses the streams take in this swampy country when the rivers have overtopped their banks. Time after time during our wanderings we came across places where a branch would take off from the main stream for no very apparent reason, and, after careering about across country by a course of its own for many miles, would gradually find its way back to its original parent, or into another river. The country is so flat, and as generally there is nothing to indicate the course of a river, it is often quite impossible to even make the

VIEW ON ABYSSINIAN PLATEAU.
(*Photo by Major R. G. T. Bright.*)

wildest guess as to where a stream is likely to go to, and, in consequence, native information (generally of a most unreliable nature) had occasionally to be accepted. The presence of streams, even when only some 50 or 100 yards distant from the line of march, was not unfrequently quite unknown to the survey party until we suddenly found ourselves right on the bank. The Adura river is the most important loop in this region, as this is really a very large one; though found to be quite unnavigable, it is often over 100 yards in breadth; but its bed is full of islands and sandbanks.

The position of Nasser Post, as now shown on the map, may be taken as the correct one, for Major Gwynn's position for it, working from

Omdurman along the Blue Nile and then south, agreed within a few hundred yards of that obtained by me by the White Nile and Sobat route from Omdurman. In the neighbourhood of Nasser the right bank of the Sobat is densely populated as far as the junction of the Sobat and Pibor rivers. The left bank is uninhabited, as nearly all that portion of the country is inundated when the rivers are full.

We left Nasser on January 7, and the following day arrived at the junction of the above-mentioned rivers. A crossing was effected on January 9, a short distance up the Pibor, which at that point was about 100 yards wide, and divided into two channels by a small island. We now entered a treeless region, and as all the tall rank grass had recently been burnt by the natives, we experienced some difficulty regarding fuel. Two days later we reached the point where the Adura river re-enters the Baro (as the Sobat is called above the Pibor junction) after an independent course for 40 or 50 miles. Here the Adura was from 100 to 120 yards in width; but fortunately fordable at that time of the year. We continued for several days longer through a most dreary and uninteresting country along the Baro. Not a tree, and scarcely a shrub, was to be seen, to break the dull monotony of the country, and the distant hills were invisible owing to a dense heat haze. All this country is one vast swamp when the rivers are full, and is then quite impassable for transport animals. At length, on January 16, we struck across country to the Adura river, and followed that river up to its exit from the Baro, which we reached the following day; thereby conclusively proving the Adura to be merely a loop of the main stream. South again of the Adura there is reported to be another river, the Mokwai, which is said to be a fine river in its lower reaches, although its exit from the Baro, some 5 or 6 miles above that of the Adura, is a most insignificant one, and barely discernible, as it is so overgrown by tall shrubs. This river is said to be joined by another stream known as the Bela, which we crossed subsequently on our journey south, and the combined streams then enter the Pibor some 10 to 12 miles above its junction with the Sobat. It was found navigable for some 20 miles up stream, by Major Capper, in 1898, but the steamer was then stopped by "sudd."

Above the exit of the Adura the banks of the Baro are well wooded, there existing in places a regular forest-growth of sycamore and other trees. Near the village of Methok, which is the limit of Nuer occupation on the left bank of the Baro, a big stream, known to the Nyuaks as the Aluro, and to the Nuers as the Nigol, spreads out into a large swamp, and finds its way by insignificant channels through a thick forest-growth into the Baro. It has its origin in the Abyssinian highlands, and constitutes a most formidable obstacle, for large expanses of both banks are converted into swamp when the river is full and overtops its banks. We later on spent three days floundering through this

TYPE OF HILLS OUTLYING THE EDGE OF ABYSSINIAN PLATEAU.

(*Photo by Major C. W. Gwynn.*)

swamp, when we struck south from Nyuak country on our way to the river Gelo, after the rains had broken.

Shortly after crossing the Nigol river, we entered the territory of the Anuaks, or Nyuaks, who inhabit both banks of the Baro, or, as they call it, the Upeno river, as far east as the foot of the Abyssinian escarpment, whence it issues out through a deep gorge on to the open plains. This portion of the river is the most fertile and attractive anywhere along its course through the plains. The country is well wooded, to a large extent free of those large expanses of swamps so general in Nuer territory, and moreover the natives are of a higher order of civilization than their more westerly neighbours. They are a peaceful, industrious, and most friendly race, who cultivate large areas of country along the river-banks, until the stony region is reached, close to the point on the river where Colonel Marchand was compelled to abandon the *Faidherbe* after leaving Fashoda. The little cultivation found beyond that point is almost entirely confined to the islands in the river, as the banks are very stony and thickly wooded. In the cultivated districts the population is very dense, and the river-banks are dotted with numerous huts and hamlets built close to the edge of the bank and overlooking the river. These huts are usually erected on small mounds slightly raised above the normal level of the bank, are neatly built of mud and wattle, with grass roofs, and are scrupulously clean and well-kept. As

a rule, they are surrounded by a fencework of tall reeds and grass, giving absolute privacy to the occupants, similar in general principle to the "kisikatis" so common in Uganda. Within the enclosure so formed, in addition to several huts for the family, are the granaries and other smaller enclosures for the herding of goats and sheep at night. The whole interior is most carefully plastered over with mud, and quite free from dust and dirt. In addition to grain of various kinds, the natives also grow tobacco and cotton. The latter commodity they do not attempt to make use of in any way, and the whole of it is usually taken over by the Gallas inhabiting the summit of the Abyssinian plateau; but tobacco they smoke themselves. As a rule, the men are more decently clad than the Nuers, as many of them wear beautifully cured skins round the loins, and they are in every way far cleaner, better groomed and smarter looking than their westerly neighbours. Beads, obtained from the Gallas, are very generally worn round the neck and waist, and in addition splendid ivory bracelets are frequently to be seen on the arms of the men. These natives, however, do not appear to be either warlike or courageous like the Nuers, and, being great agriculturists, their main desire seems to be to cultivate their fields and remain at peace with their neighbours. Their spears are generally small-headed with long handles, and many of the men and boys are armed with merely sharp-pointed sticks hardened at the ends by fire. We saw a very curious species of spear amongst these

IN THE ABYSSINIAN HILLS.
(*Photo by Major C. W. Gwynn.*)

natives, the heads of which are manufactured from the leg-bone of a giraffe, polished down to about an inch or three-quarters of an inch in diameter, some 18 inches in length, and sharpened to a fine point. This is secured in the ordinary way to a long wooden handle, and the join covered by lizard-skin.

The elder married women all wear skins, cured or otherwise, round the loins, and these are often daintily picked out with a border of

NUER SHEIKH AND SON.
(*Photo by Major C. W. Gwynn.*)

varicoloured beads. The dress, if it may be so called, of the unmarried women and girls consists of an accumulation of beads round the neck, and a large number of strings of beads round the waist, from which a small fringe, as it were, of generally white opaque, or white and light-blue, beads depends some two or three inches in length over the hips, and in front and behind. As the girls are often very beautifully made, and possess pleasant, laughing, and sometimes really pretty faces, a group of them together forms a most charming picture.

On January 26 we reached the point in the river beyond which Marchand had found it impossible to navigate his launch, the *Faidherbe*, owing to the existence of rocks and rapids in the bed. He had in consequence drawn the launch up on to one of the wooded islands, and, after securing it by chains to neighbouring trees, and building a grass house over it to protect it from the weather, had abandoned the launch, together with several aluminium barges. The natives pointed out to us the island on which it was beached, and accompanied us across a ford to the site of the boat; but nothing would induce them to approach the grass hut, nor enter the presence of the boat, which they viewed with the greatest superstition, imagining apparently that the house was erected for the accommodation of evil spirits left to guard the steamer. Some two months later, and by the order of the Emperor Menelik, large numbers of Gallas and Abyssinians were sent down from the summit of the plateau, with instructions to take the steamer to pieces and convey it in sections to Adis Abeba. An Abyssinian specialist was sent down from the capital to superintend the transportation and the taking to pieces. The hull, some 50 to 60 feet in length, however, was merely cut in two, and carried with great difficulty to the foot of the steep ascent of over 3000 feet from the Baro gorge to the top of the plateau. Whether it ever reached the top I cannot say, as we left the country before the ascent was commenced; but, as nothing more than a precipitous goat-track to the summit existed at that time, and each of these large sections required about 100 men a-piece to transport it, I fancy a good many Gallas are likely to have met with violent deaths during the undertaking, unless a good road was constructed, or the sections were still further cut up. The Abyssinians, however, led us to understand that, cost what it might, the boat in its entirety was to be taken to the capital.

The nature of the country now underwent an entire change. The swampy soil we had become so familiar with gave place to stone and gravel. Low rocky hills approached the river-banks, which were densely wooded with trees and scrub, necessitating a considerable amount of cutting in places to enable the transport animals to travel with their loads. Several large sandy beds of streams were crossed; but, owing to the close nature of the country, it was impossible to conjecture whence they came. As they were all dry, however, I think it unlikely any of them have their origin in the highlands, with the exception of the Bonga, a small stream, at that time, of running water 15 to 20 yards wide, and 6 to 9 inches deep. A few miles beyond the Bonga we entered the gorge of the Baro, and as we proceeded further up, lofty hills enclosed the valley until eventually, after crossing the Baro a few miles above where it was joined by the Birbir river from the north, we were confronted by the steep ascent of over 3000 feet to the summit of the Buie plateau. This ascent was accomplished with

great difficulty in two stages. Fortunately, the Abyssinians came down with large numbers of Gallas to assist us in the undertaking, or we should never have been able to accomplish it. After a long trying day, during which we found our camels quite unequal to climbing the steep slopes, we reached a rocky nullah with pools of water, some 1400 feet above the river. The Gallas carried in our camel-loads; but, in spite of these ungainly animals being unloaded, they succeeded in leaving the narrow track, and took an ignominious dive down the side of a precipitous hill-slope until they were brought up sharp by the rocky nullah some 50 to 60 feet below. Eight donkeys, with their loads, had previously started the fashion, and what with camels and donkeys

CULTIVATED COUNTRY: LEGA GALLA.
(*Photo by Major C. W. Gwynn.*)

lying about in a confused mass below, we had a pretty lively time, and spent several distracting hours before we could get them up again and into camp, which was only a few hundred yards beyond. Marvellous though it seemed to us, none of the animals were killed, and all were eventually got into camp by dark, with the exception of one or two camels which were brought in next day. Men and animals were pretty well worn out, although we had only marched some 4 miles, so it was somewhat depressing to find that the final ascent of 1800 feet to the summit was quite impracticable for loaded animals. However, the Abyssinians came to our rescue by supplying us with large numbers of Gallas, who, during the next two or three days, carried up

all our belongings, enabling us to take the animals up empty; but the camels were hopeless, and at the end of three days we had with the greatest difficulty only managed to get six out of the seven to the summit. The seventh never lived to breathe the exhilarating air of the plateau above, as he succumbed to his efforts long before he could be dragged to the top. A mule and several donkeys also found the climb too much for them, and, much to our regret, sought peace and rest from their troubles by lying down and refusing to live any longer.

It was really a most dreadful climb, and one not to be lightly entered upon when encumbered with a large number of transport animals. We were now at an elevation of about 5200 feet, and the fine air, vegetation, and beautiful butterflies reminded Major Bright and me very strongly of Save, on the northern slopes of Mount Elgon, in East Africa. The view from our lofty position across the Baro and Birbir valleys lying so far below us was grand in the extreme, and occasioned some very quaint remarks from our Sudanese, many of whom had never before been in or even seen hilly country. Major Bright's boy remarked to him, in broken English, that he didn't see how we were ever going to get out of the country again, as there were "hills at all four corners." The edge of the plateau hereabouts is uninhabited, and it was not until we had proceeded some 6 or 7 miles in an easterly direction through undulating wooded country that we reached the first Galla settlements. Here, unfortunately, I was taken seriously ill, and it appeared doubtful at one time if I should recover. Thanks, however, to Major Bright's assiduous attention to me, I was sufficiently well at the end of a fortnight to continue the journey from Bure to Gore, where the head-quarters of the Abyssinians of this region are situated.

Our road for the next 11 or 12 miles passed through a most fertile tract of country, intersected by numbers of small valleys and streams. In every direction small huts and hamlets are dotted about, as the Gallas hereabouts are very numerous. These have cleared extensive plots of ground for cultivating purposes, and quantities of grain are grown throughout the Bure district. In addition to cereals of all sorts, such as dura and Indian corn, peas and beans; tomatoes, potatoes, and coffee are also grown by the Gallas. They are rich also in flocks of goats and sheep, and possess cattle, but in lesser numbers; whilst eggs, butter, milk, and honey are generally easily obtainable. Mules and donkeys are bred extensively on the plateau, and horses and ponies are also seen in large numbers. Although we saw no cotton grown on the plateau, it is brought up from the Baro valley by the Gallas, who weave it into a thick coarse cloth, with which the better class of them and most of the Abyssinians are clothed. The coinage generally employed by the Gallas consists of bars of salt some 8 inches in length, 2 to $2\frac{1}{2}$ inches broad, and perhaps an inch thick. These are bound at intervals

with grass to prevent their cracking. In the Bure and Gore districts ten bars of salt without a flaw were regarded as the equivalent in value of a Maria Theresa dollar.

The Bure district, as already mentioned, is cleared to a large extent, but after descending from a ridge some 18 or 19 miles from the edge of the plateau into a seeming hollow and entering the Abiu district, the country becomes very thickly wooded, and the inhabitants less numerous. The physical features of the country still remain much the same, but more confusing, as an amazing labyrinth of ridges and valleys is traversed. The country is so close that whence the numerous

GIDOMI MARKET.
(*Photo by Major C. W. Gwynn.*)

streams come or whither they go it is quite impossible to see. They all, however, eventually find their way into the Birbir river, and so into the Baro. Some miles before the foot of the Gore ridge is reached, the track passes through an uninhabited region. The whole of this portion of the country lies between 5000 and 6000 feet above sea-level, and, as may be readily imagined, is very hilly and difficult for transport animals accustomed to the plains.

Gore town is situated on the summit of a high grassy ridge, very much in the shape of an irregular horseshoe, at an altitude of about 6580 feet above sea-level. The ridge is crowded with the houses and huts of the Abyssinian officials and soldiery, as well as those of a large Galla population. In addition to a large council-chamber,

workshops, arsenal, store-rooms, etc., the Abyssinians have built a small church here, in the churchyard adjoining which the remains of the late M. Clochette, a French officer who died at Gore a few years ago, are interred. The climate of Gore is most bracing, and a magnificent view is obtained on a clear day of the whole surrounding country. The cold at nights, however, is very great, and we suffered most serious losses amongst our transport animals, who were quite unaccustomed to it, and died off at an alarming rate.

So much has been written and said of the Abyssinians, that I do not propose dealing with them, as I fear this paper is already running to greater length than I had intended. We remained altogether close on two months amongst this warlike race, of whom we saw a great deal during our residence. We were not sorry, however, to leave the country, for the loss of so much of our transport was occasioning us great anxiety, as we were not able to fully replace our losses by purchasing fresh ones from the natives. In spite of purchasing some thirty-eight donkeys and three mules from the Gallas, by the time we reached the edge of the plateau on our return journey we found our transport reduced in numbers by more than half, as we had only some sixty-eight donkeys capable of carrying loads, one camel, and six mules. We experienced considerable difficulty in removing our loads to the gorge of the Baro valley from the summit of the plateau, and for the next three weeks we had to proceed by double stages to Itang, as we were unable to carry all our gear with our diminished numbers. We purchased food from the Anuaks as we went along, and on our arrival at Itang on April 24 we decided to abandon everything not absolutely essential for the journey south, trusting later to be able to recover the stores left by steamer from Nasser, as the river is easily navigable, when full, up to that point. The headman of the village agreed to store our things until called for, and also provided us with two guides to conduct us south to the river Gelo, where we were to pick up fresh guides.

We spent a few days at Itang, to enable our transport to pick up strength for the journey, as the grazing they had enjoyed for several weeks past had been very scanty; and on April 29, after a complete reorganization of the expedition, we started south. The first day's march, however, we encountered a most formidable swamp some 12 miles from the start. This had been formed by numerous spills from the Aluro river, which had overtopped its banks owing to the recent heavy rains. Several of the spills were waist-deep, which necessitated the unloading of all the animals, and the loads being carried across by men. By 6 p.m. we managed to reach a piece of high ground, a mere mound in this area of swamp, on which it was possible to camp.

Floundering through another half-mile of swamp, next day we reached the Aluro, a rapid stream in heavy flood, some 20 yards in width. The whole morning was spent transporting all loads, etc., to

the south bank; but early in the afternoon we were visited by a heavy downpour of rain, which continued until after dark, so we remained camped in some 6 to 9 inches of liquid mud and water. We pushed on again next day; but only made one more mile in a southerly direction through the swamp to another mound occupied by a colony of fishermen. These came to our assistance, and helped us to carry our loads to this point, as many of the donkeys were quite incapable of travelling

A DINKA AT FASHODA, SHOWING CURIOUS METHOD OF DOING HAIR.
(*Photo by Major C. W. Gwynn.*)

loaded through the mud, and the camel carrying our Berthon boat was hopelessly at sea. The following day another mile took us through the swamp, and we continued our march to a swampy khor—the Bela by name—some 11 miles distant. On May 3 a long and exhausting march of 14 miles, which occupied the whole day from 6 a.m. to past 6.30 p.m., brought us to the Gelo river and the village of Patok. Progress on the march was dismally slow, as our animals frequently became involved in tracts of bog into which they sank almost up to

their knees, and gracefully collapsed. Each donkey had to be individually unloaded, forcibly hauled out of the bog, and carried to drier ground before it could be reloaded and started off again.

On reaching the Gelo I had hoped to be able to proceed in the direction of Lake Tata, and there cross it; but we found it was quite out of the question to travel with transport animals, as the Gelo, like the Aluro, had overtopped its banks, and converted such a large expanse of country into swamp, that the river was unapproachable. Heavy rains were daily falling also, and the outlook was gloomy in the extreme, as some 25 per cent. of our men were down with fever after our experiences in the Aluro swamp, and a large percentage of the donkeys were also suffering from the same cause, and in a short time ten died, and six or eight became incapable of carrying loads. It soon became patent to us all that, unless we made every endeavour to get out of this country without delay, we should become hopelessly involved in bog and swamp, through which we should never be able to get our transport animals. With much reluctance, therefore, we were compelled to abandon all idea of reaching Lake Rudolf, and decided to make for Nasser Post as speedily as possible.

On May 5 we started off again in a westerly direction down the Gelo, and for the next few days travelled by an inland track some distance from the river, which was fringed with a broad belt of swamp, and passed several large villages of the Anuaks concealed in thick belts of wood and stockaded. On May 8 we were able to camp once more on the river-bank, at a point where it was some 80 to 100 yards in width. For the next three or four days we followed the river-bank until we were blocked by a large expanse of swamp, where a swampy stream reported to flow out of the Mokwai, known as the Nimeri, closely approaches the Gelo, and is then said to flow north-west again into the Mokwai—another loop. Swamp was everywhere before us, north, south, and west, so we retraced our footsteps some 3 miles up the Gelo, and effected a crossing to the south bank, where it was little more than 30 yards wide, though very deep and flowing like a torrent. A branch goes off from the Gelo close to the point of crossing, and, after flowing west for a bit, runs up north (by report), and re-enters the Gelo at the junction of that river with the Pibor close to the village of Bil—again a loop. This river, the Gelo, is undoubtedly the one that the late Captain Wellby, in his splendid exploratory expedition from Adis Abeba to Nasser, describes as having been met with and crossed at lat. N. 7° 50′, where it appeared to flow from the south-east, was "over 30 yards broad, 8 to 10 feet deep, flowing about 3 miles an hour, and infested with alligators." Being in flood and nearly bank-full when we crossed it, the river was 13 feet deep, and flowing 4 to 5 miles an hour. During our journey along the Gelo, therefore, we must have crossed Captain Wellby's route. From May 8 to 12, as already

mentioned, we followed the north bank of the Gelo closely, and during that period no river from the south flowed into the Gelo. I was constantly on the look out for it, and inquired from my guides if they were sure one did not do so, as I was anxious to identify Captain Wellby's Ruzi. They told me of the existence of another river, the Akobo, further south, which I am inclined to think must be the same Akobo followed by Böttego as far north as Tedo, and is probably identical with Wellby's Ruzi.

After we had crossed the Gelo, therefore, we struck across an open plain in a south-westerly direction for some 15 miles, until we reached

OLD EGYPTIAN LINES AND NEW FRENCH FORT AT FASHODA.
(*Photo by Major C. W. Gwynn.*)

the Akobo at lat. N. 7° 46′ 32″. This river was fortunately not in flood: it was only some 20 yards broad and 3 to 4 feet deep, and flowing very sluggishly through a canal-like cutting, so we had no difficulty in crossing it. For the next two days we followed the river by a most extraordinary winding course, and yet flowing due west, until we reached its junction with the Pibor at lat. N. 7° 47′ 41″·4. It would appear, therefore, that the Akobo or Ruzi and the Gelo rivers never meet, but flow by independent courses into the Pibor. The Pibor, at the point we struck it, was some 70 or 80 yards wide and 11 feet deep, with practically no current, as it was not yet in flood. We crossed to the west bank by means of the Berthon boat, and the

following day were confronted with the Khor Geni, which I have already referred to as being probably the same as that entering the Sobat river some miles below Nasser Post. As it was 30 yards broad and 10 feet deep where it flowed out of the Pibor, we had to again use the Berthon boat to reach a deserted village on the opposite bank. For the next day or two we continued along the Pibor, passing several deserted villages which are merely used as fishing villages during the dry seasons of the year by the Nuers, until we reached a thickly populated district where Sheikh Yowe and some 7000 Nuers are settled in a group of villages known as Wunadeng, Uentau, and Koratong. Here we obtained food and fresh guides to conduct us to Nasser Post, and on May 22 camped opposite the junction of the Gelo with the Pibor at lat. N. 8° 8′ 45″. Three rivers meet at this point, the third probably being the branch from the Gelo which flowed out of that river close to where we crossed it prior to marching south to the Akobo. The natives told me it was deep, and canoes were required at Bil village to cross it. I was, unfortunately, unable to fix accurately the junction of the Mokwai with the Pibor further north, as we were compelled to leave the bank of the Pibor some distance above, owing to a large expanse of swamp extending from just north of Kur village to the Sobat-Pibor junction. About this time we were treated to very heavy rain, which converted the whole country into bog, and travelling with donkeys was a most laboured undertaking. We struck the Sobat again some 3 or 4 miles below its junction with the Pibor on May 26, and the following day pushed straight through to Nasser Post by the track we had previously traversed early in January. During the five months since we had left the Dom palm camp on December 28, our losses in transport animals had been very heavy, as 108 donkeys had died, and all the camels, and nine out of the ten original mules had also succumbed. The stores abandoned at Itang were subsequently recovered by steamer towards the end of June, and Omdurman reached on July 7. A few days spent here were sufficient to enable us to complete all handing over of stores, etc., to Colonel Talbot, R.E., before leaving for Cairo and England.

NOTES OF A JOURNEY ON THE TANA RIVER, JULY TO SEPTEMBER, 1899.

By Captain H. de PREÉ, R.H.A.

A FEW notes about a shooting expedition made on the Tana river, East African Protectorate, by Lieut. Hankey, Royal Horse Artillery, and myself, may be of some little interest now that attention has been drawn to that part of the world by the rising of the Ogaden Somalis.

SOMALI HUT AND CATTLE ENCLOSURE, KISMAYU.

After landing at Mombasa from Bombay, and making various preparations, we took the East African Protectorate steamer *Juba* to Kismayu, whence we hoped to make our way through southern Somaliland, a hitherto almost untravelled country, past the chief place Affmadu, to the Gwaso Nyero river, and so round the north of Mount Kenya to the rail-head of the Uganda railway, which was at that time just past the Athi plains. Through the kindness of Mr. McClellan, of the East African Protectorate service, we purchased about forty camels in Italian Somaliland, and were just ready to start when an order came from the British Foreign Office forbidding our journey. We consequently had to dispose of our camels and trade goods, and a large part of our leave was wasted, but we determined to go about 170 miles down the coast to Lamu, and to make that a starting-point for the Tana river.

The Tana river is about the southern limit of the Somalis, who, although they do not live on it, raid the Gallas and Pokomos who inhabit its banks. As a result of the fear they instill, the villages are generally built on the right bank and in the dense forest that lines the river. In the lower reaches the river runs through wide flat alluvial country, where tropical forest alternates with open plains (which are evidently dried swamps) and slight cultivation. Higher up the forest belt is continuous, and has a greatest breadth of, say, 2 miles. Outside this stretches the dry sandy bara as far as the eye can reach. It consists of wait-a-bit and various kinds of mimosa scrub, mostly about 10 feet high, with an occasional *Euphorbia candelabra* and umbrella tree. Here and there this bara comes right down to the river, and these

places are called by the Gallas "Malkas." This means "drinking-places," from the fact that they usually travel just outside the forest belt, and these are the only spots at which they can get down to the river to drink. Nearly all communication between the villages is by canoe, though the Gallas travel a good deal on foot. The Pokomos, in spite of being an extremely muscular and well-developed race, are the most abject cowards, and are greatly afraid of the Gallas; while both races seem to fear and to suffer much at the hands of their neighbours. As an instance of the dread they have of leaving the shelter of the dense forest by the river, I may say that on three occasions we found the tusks of elephants, who had died, lying no very great distance from it, and two of these pairs must have been where we found them for years.

At the time of our visit, the Wakamba from the south of Mount Kenya had invaded the upper Tana, and this, coupled with an epidemic of small-pox, had caused practically the whole of the proper inhabitants to flee the country. The people are now too educated to care much for the majority of trade goods. Any very small object may still be got for beads of the kind that happens to be in fashion, but the only articles that are welcome everywhere are white Americani cloth and big common sheath knives. A Somali knife is considered a great prize. Rupees are current as far as the mission stations, and they are always asked for as part of the payment for ivory, because the Gallas like getting them to take down to the coast to purchase cattle with.

MSANIA TRACKER

As our transport consisted partly of canoes and partly of porters, it was necessary to arrange each day so that both parties should meet—no easy matter without a local guide (the Gallas are infinitely the best guides), on account of the tremendous windings of the river and the denseness of the forest. The windings are such that in a combined land and river party moving up stream, starting at 6 a.m., the land party will get into camp at 10 or 11 a.m., while the canoes will not reach it till 4 or 5 p.m. Canoes hold from fifteen to forty loads. They

are usually worked by two men with punt poles or paddles. The Pokomos are the best punters I have seen in any country.

Near the Malkas are the chief drinking-places of the game, which mostly live in the bara. The natives harry the game a great deal, the Wasānia or Wāta or Wabōni, the hunting tribe of the country, being always after them, snaring them and sitting up over water for them, and nearly every village has its game-pits. The elephants are the chief victims, as the natives, besides Arabs and Swahilis from the coast, spare neither age nor sex, and if the Government, instead of troubling as much as they do about the shooting of European sportsmen, would turn their attention to this butchering of cows and young ones, their efforts at preserving game might be more effective. A few Gallas kill elephants in a very daring manner, though, and deserve everything they get. They track them from water till they stop to rest, either standing sleeping at night or drowsing under a tree in the heat of the day. They then smear themselves with elephant-dung, and, creeping up, plunge a spear with a head like a trowel into the elephant's belly, slipping away at once in the confusion. The elephant rushes off, the handle of the spear catching in all the bushes, and his intestines are soon so cut about that he lies down and dies. The large majority of natives, though, have a most wholesome dread of any dangerous beast. The elephants on this river seem to carry as heavy tusks as any in the world. Out of the tusks of four elephants we shot, the shortest was 7 feet 2 inches, while the longest was 9 feet $5\frac{1}{2}$ inches, and the weight varied from 80 lbs. to 120 lbs. apiece.

KISMAYU, WITH ARAB FORTS.

The buffaloes, which were at one time in vast numbers, but were swept away by the rinderpest a few years ago, are increasing very fast. For any one not subject to fever, the shooting is good; we obtained about twenty different kinds of game during the trip; but the bush is very thick, and any game that is got has to be worked for.

The lower Tana is made absolutely unbearable by the mosquitoes,

VIEW ON THE UPPER TANA.

but above Golbanti (the chief English mission station) they begin to grow fewer, and gradually almost disappear.

The official map of the country is most misleading, as a large number of the villages marked have either shifted or disappeared. The Malkas seem to be the most permanent landmarks in the country. The Galla mountains and Mount Friedrich Franz shown on the official map are, I fancy, a myth of Dr. Peters, as from the mouth to the great bend of the Tana where it turns west there is certainly nothing worthy of the name of a mountain, and nothing can be seen on either bank but a sea of scrub, even on going a long day's march from the river. The same can be said as far as a few miles short of the Hagarso falls (the limit of navigation), which is as far as we reached.

Captain Rogers, of the East African Protectorate Service, Sub-Commissioner of Lamu, showed us the very greatest hospitality. He was the means of our getting canoes and canoemen on the Tana, and without his kind aid we should have found it almost impossible to start at all. Perhaps it would be unsafe to travel without an escort of some sort, but we never had the least trouble with any of the natives, and we finished the expedition without a mishap of any kind.

MADABA MAP.

By C. RAYMOND BEAZLEY.

The sixth-century mosaic map of Madaba, the earliest piece of Christian cartography and one of the oldest geographical plans in the world outside the Egyptian and Assyrian monuments, deserves more attention than has yet been paid it in England. Three continental studies have lately appeared—(1) Germer-Durand's pamphlet of 1897 (*La carte mosaique de Madaba, découverte importante*); (2) Konrad Miller's summary of Germer-Durand, in an *Anhang* to the *Rekonstruierte Karten* of 1898; and (3) Adolf Schulten's more detailed work of 1900

(*Die Mosaik-karte von Madaba u. ihr Verhältnis zu den ältesten Karten u. Beschreibungen des heiligen Landes*). Of these the first is not only the *editio princeps*, but contains (with the *Révue Biblique* of April, 1897) the best photographic reproductions of the map which have yet been published; the second is, for the most part, but a shortening of the first, with a Latinized and clarified copy of the map; the third is a work of great, almost of excessive, elaboration, consisting of an introduction and three special inquiries—on the relationship of the Madaba map to the *Onomasticon* of Eusebius, on its analogies to later maps and itineraries, and on its points of contact with 'profane geography,' especially as represented by the lost Julian and Augustan world-maps. It may be well briefly to recall the main facts as to the re-discovery of the mosaic. In 1880 the Christians of Kerak moved to a new home at Madaba, near the ancient Heshbon, and in clearing a floor for their new church laid bare (in the autumn of 1896) the remains of a scheme of Palestine and some adjacent lands. To Father Kleophas, librarian of the Greek Patriarch at Jerusalem, the discovery and preservation of this map are chiefly due; and some of the happiest suggestions for its further reconstruction have also come from him. From the fragments discovered it was clear that the original once occupied a space of about 15 by $6\frac{1}{2}$ metres (say almost 49 by 20 feet); its length lies from north to south, but the east is at the top, as in most primitive and mediæval Christian designs. All the north part is now destroyed, except two fragments; and what remains, in all about half of the complete scheme, is mainly concerned with the country between Nablûs and the Nile. The orientation has been greatly disturbed by the assumption of the Levant coast, from Alexandria to Acre, as a base, supposed to furnish a line running practically north and south. In its general purpose this is a decorative, freely conceived, and by no means scientific, illustration of Bible history. Names and objects are not kept in any strict proportion; the perspective is conventional; but the rich store of inscriptions furnishes not a few details of novel interest. Mountains are indicated in coloured lines, which give fairly well the effect desired. The Dead sea is marked by blue wavy lines; two boats, of preposterous size, float upon its waters. In the larger towns, such as Jerusalem, Pelusium, and Gaza, an attempt is made to represent the principal streets (marked by colonnades), and even certain of the chief buildings, sometimes in round, sometimes in angular, forms. Cities of the second class are indicated by sketches of walls flanked by round towers. Each of the tribes of Israel seems to have originally appeared (Κλῆρος Δὰν, κλῆρος Συμέων, κ.τ.λ.) in great red letters, accompanied in some cases by a text of Old Testament prophecy. In many instances, and apparently wherever there is abundant space, the place-names are doubled, the ancient form being given along with that in use at the time of composition (*c.* A.D. 550); here and there historical or geographical remarks are added.

Out of the twelve tribes of Israel, only six can still be found—Dan, Symeon, Juda, Ephraim, Benjamin, and Zabulon—and several of these survive in a very fragmentary state. In connection with *Dan*, the apostrophe of Deborah from Judges v. 17 is quoted (*ἵνα τί παροικεῖ πλοίοις ;*) as to *Benjamin*, the blessing of Moses from Deut. xxxiii. 12 is given (*σκιάζει ὁ Θ[εό]ς ἐπ' αὐτῷ, καὶ ἀνὰ μέσον τῶν ὀρίων αὐτοῦ κατέπαυσεν*), probably in allusion to the holy city, lying as it did within the territory, but on the frontier, of Benjamin. *Ephraim* is associated with the blessing of Jacob upon Joseph, from Gen. xlix. 25, and with that of Moses upon the tribe of Ephraim, from Deut. xxxiii. 13 (*Ἰωσήφ . . . εὐλόγησέν σε ὁ Θεὸς εὐλογίαν γῆς ἐχούσης πάντα καὶ πάλιν ἀπὸ εὐλογίας Κυ[ρίου] ἡ γῆ αὐτοῦ*). As for *Zabulon*, there now only remain five letters from a clause of the prophecy of Jacob in Gen. xlix. 13; but the whole sentence was fortunately copied before this piece of the mosaic perished: *Ζαβουλὼν παράλιος κατοικήσει, καὶ παρατενεῖ ἕως Σιδῶνος.* The remaining details of the map may be dealt with under the tribes above mentioned, under the trans-Jordan region, and under Lower Egypt and Sinaitic Arabia.

In the territory of *Dan*, Modeim or Moditha, 'whence came the Maccabees;' Anob or Betoannaba, the Nob of Saul, according to St. Jerome; Lod, Lydda, or Diospolis; Geth or Gath, 'one of the five satrapies of former days;' Ashdod in the upland, and Azotus on the sea, are the leading places indicated. In *Benjamin*, the plan of Jerusalem naturally occupies the chief place. Here the most prominent feature is the great street flanked by colonnades which runs across the city from the north gate to the south; before the north gate there seems to be a paved square, and on it a column, recalling the modern title of 'Gate of the Pillar.' A second colonnade-street runs from this north gate to the south-east, crosses a lesser artery which enters from the eastern gate, and then proceeds due south, just within the east wall and parallel to the main street. These two roads are marked all along by the covered galleries or colonnades already noticed, and probably correspond to the *δύο δημόσια*, the two markets or bazaars, mentioned in an Arab account of the Persian storm of 614. Three gates are indicated, to north, east, and west; the first two being apparently of much greater size and importance than the third, which has rather the appearance of a postern. The Church of the Holy Sepulchre, with its round end towards the west, and communicating with the street on the east by a staircase, represents the work of Constantine and Helena, the first of the successive Christian sanctuaries on the site of the Passion. To the south, at the end of the great centre colonnade, appears what is probably the Church of Holy Sion or the *Cœnaculum;* at the north-east extremity of the city is another church, perhaps that of the Nativity of the Virgin (now 'St. Anne'); while beyond the walls, to the east, is the Church of Gethsemane and the Virgin's Tomb. The whole sketch of Jerusalem refers to the

time before the Persian destruction of 614, but subsequent to Constantine; more narrowly, it seems to preserve an excellent summary of the city's main features in the time of Justinian. The territory of Benjamin appears undamaged upon this map, and the localities of Jericho, surrounded by palm-trees, in the midst of which appears the 'sanctuary of Elisha;' of Ephrata, 'where the Lord journeyed;' of Ælamon, 'where the moon stood still at the bidding of the son of Navê;' of Bethabara, with the convent of St. John Baptist; of Rama and Gabaon; and of two road-stations respectively called 'the fourth' and 'the ninth' (*τὸ τέταρτον . . . τὸ ἔννα[τον]*), appear together with a few less important spots. Here, as elsewhere, the likenesses with St. Jerome's topographical indications are very marked, those with Eusebius, Jerome's master in Palestine geography, being somewhat less close than in other places. In *Ephraim*, part of the space (*e.g.* around Nablûs) has perished; on what remains we have Ænon, 'near to Salem;' Silo, 'where stood the ark;' the tomb of Joseph; the well of Jacob; Garizim; and Sichem, 'otherwise Sikima and Salem' (an exact repetition of a peculiar notice in Eusebius' *Onomasticon*). Like the latter, again, the map places the mountains of blessing and cursing near Jericho, though it has already marked them in the right position near Nablûs. The Aramaic term of tûr, or mountain (Τουρ), is annexed to both Γαριζίμ and Γωβήλ, Gerizim and Ebal. The towns of Theraspis and Betomelgesis, apparently assigned to Ephraim by the present design, are unique; no trace of them has elsewhere been found. In *Zabulon* nothing remains beyond what has been already noticed; but in *Symeon* we have Gerara, 'once a royal city of the Philistines and southern limit of the Canaanites.' *Ἔνθα τὸ Γεραριτικὸν σάλτον, here is the wood* [?] *of Gerara*, adds the map, which also gives, in the territory of this tribe, Arad, 'whence came the Aradians,' and Asemona, 'a town of the desert on the frontier of Egypt.' Arad is the Adar of the Vulgate, and Jethor, or Jethera, to the west of it, is the Jether of the *Onomasticon*, which notes it as wholly inhabited by Christians. In the west of the land of Simeon, the mosaic records several peculiar names (Edrain, Sobila, Seana, and Bethagidea; cf. the Edrai-Bethaglaim of Eusebius). In *Juda* much of the original detail has been lost, but to the south of Jerusalem is Akeldama, which is placed considerably to the north of the common or traditionary site, supported by St. Jerome; the unusual position is no doubt due to Eusebius, whose language here agrees with the map. Bethlehem Ephrata, Rama, Bethsura (of the Maccabees), the church of St. Philip near the fountain where he baptized the Ethiopian, the terebinth-oak of Mamre near Hebron, Ascalon, Gaza, and Beersheba or Berossaba, are the chief Judean names; and 'so far,' says the map of the last mentioned, 'came southward the limits of Judea, even from Dan, near Paneas, which is the border in the north.' Gaza and Ascalon, though fragmentary, are evidently planned

as large towns, and a good deal of these city pictures still remain. Beyond the Jordan appear Ænon, 'now Sapsaphas' (perhaps [?] named after an early sixth-century monk and saint of this name, and in any case the 'Sapsas' of the seventh-century Johannes Moschos); the Baths of Kallirrhoe, marked as three in number; Kerak of Moab [Κρ]άχμωβα, on a height, as in nature; Betomarsea, 'otherwise Maiumas,' found only in this mosaic; Aïá, perhaps 'the Aïê of the *Onomasticon*,' the ancient Rabbath Moab, the Greek Areopolis; and Balak, 'or Zoora,' to the south of the Dead sea (Lot's Zoar). The principal inscription of this part refers to the same Dead sea, also called the Salt or Asphaltic lake, whose enormous size and detailed execution suggest that it was well known to the designer. Finally, in Lower Egypt and the desert of Sinai are a number of places and legends. Among these are 'the Desert where the brazen serpent healed the Israelites;' 'the Desert of Sin, where the manna was sent down and the quail [*sic*];' and Raphidim, 'where Israel fought Amalek.'

According to a tradition at Madaba itself, the map, when first uncovered, had a picture of the holy family flying into Egypt, not along the coast as in later stories, but well inland across the desert. Rhinocorura and several towns lie on the edge of a curiously exaggerated stream marked as the frontier of Egypt and Palestine; in the Delta, Pelusium, though in fragments, appears as a city of great size and splendour, second only to Jerusalem; Tanis, Sais, Xois, Athribis, Hermoupolis, and five other Egyptian towns are also figured; while three arms of the Nile are enumerated—the Pelusiac to the north [east], an unnamed and partially destroyed channel to the south [west], and the Sebennitic in the middle, with three ramifications—Saitic, Bucolic, and Bolbitic. These names are all inscribed along the course of the stream.

We cannot here do more than refer students to the detailed comparison between the Madaba mosaic and the *Onomasticon* made by Schulten, a comparison which is capable of considerable refinement, and is well followed out both in the general topography and orientation and in the minor details. It is only in certain points, however, that practical certainty can be attained of any direct use by the map-designer of Eusebian material. The relations between this plan and the text of St. Jerome, the so-called Jerome maps, and the chief pilgrim itineraries of the earlier Middle Age, from the Bordeaux of 333 to the Willibald of the eighth century and the John of Würzburg of the twelfth, are carefully examined; each of the mosaic's 140 names and legends is separately passed in review and compared with everything fairly analogous in later classical and earlier mediæval geography; and one result of this is to warn us against too ready an assumption of intimate connection on the ground of verbal coincidences, which may often be accidental.

THE SCULPTURE OF DESERT REGIONS.*

THE work of Prof. Johannes Walther during the last fifteen years has placed him amongst the first authorities on the desert lands of the globe, for he has not only brought an almost unrivalled critical knowledge of travel literature to bear on the subject, but has himself made three considerable journeys in desert regions in various parts of the world. The publication of a summarized statement of the matured results of his studies to the present time is, therefore, a real service to students of geography and geology, all the more when, as in the book before us, that statement takes the form of a luminous exposition of the whole subject, illustrated by photographs and drawings of a standard of excellence rarely reached in works of the kind. We would specially commend these illustrations to teachers as type specimens difficult to obtain elsewhere.

The fundamental proposition laid down by Prof. Walther is that a desert region is essentially a region without external drainage, and that therefore all its material, soluble and insoluble, can only be transported about within itself, excepting only trifling quantities of dust and sand carried by wind over the water-parting which bounds it. Such a region is necessarily complete in itself, and in an exhaustive investigation all material eroded and transported from one part must be accounted for in another. Next, while drawing some interesting comparisons between the surface of a desert and the floor of the ocean, Prof. Walther refuses to consider that desert regions are in general ancient sea-beds, and he further rejects all theories which try to account for the present relief of such regions by periods of different climate in the past. The desert region is to be regarded as one over which the conditions have remained as we now find them for periods at least commensurable with the persistence of present conditions in equatorial and temperate regions, and it follows as an immediate consequence that the modelling of its surface must be accounted for by the action of forces still at work.

In dealing with the effects of erosive action in deserts, Prof. Walther rightly insists on the futility of attempting comparison with more familiar regions of abundant moisture. The desert is, as he says, the land of geographical paradox, rain-clouds which distribute no moisture, springs without streams, rivers with no mouths, lakes with no outlet, dry valleys, dry deltas, waterless regions below sea-level, intense watering without weathered rock-surfaces, and decay of rocks from within outwards; obviously a land where the most skilled interpreter

* 'Das Gesetz der Wüstenbildung in Gegenwart und Vorzeit.' Von Johannes Walther, ao. Professor der Geologie und Palæontologie. Berlin: Dietrich Reimer (Ernst Vohsen). 1900.

of the topography of moister regions must go warily. The chief points here brought out may be summarized as follows. The weathering action taking place at all surfaces is intense, and is mainly of two kinds—chemical action in the soluble constituents of rock, brought to the surface in solution through the rock pores and there deposited by evaporation, and mechanical action due to rapid large changes of temperature. In the chapter devoted to "dry weathering," we find many new points of interest in connection with the hard dark-coloured skin frequently observed in desert rocks, due to the oxides of iron and manganese; also valuable observations of diurnal changes of temperature of the rock surfaces. Then comes the most important generalization of all, the definition of the true action of wind as a transporting agent which removes the weathered rock material, whether soluble or insoluble, as soon as it appears at the surface, thus constantly exposing fresh rock to the erosive forces, and deposits it again at a distance. To this action Prof. Walther gives the distinctive name of Deflation; he regards it as *the* determining factor in desert sculpture, and relegates the abrading action of blown sand to a quite secondary place.

The primary agent in the reduction of a desert surface being thus clearly defined, special attention is given to modifications of its action produced by other agents, and especially by the cloud-bursts met with in all deserts. Prof. Walther gives descriptions, drawn from various sources, of the appearance of rain-clouds over a level surface of desert, where great condensation is obviously taking place in the upper strata of the atmosphere, although no rain reaches the ground; and he shows that sudden precipitation of enormous quantities of water must take place when such a cloud strikes an elevated mass of land. The water, carrying with it all the disintegrated material too large to be removed by wind, rushes down the mountain-side, tearing open any cleft through which it can find its way, and scattering detritus over the plain, and is quickly evaporated, throwing out large deposits from solution. The opened cleft is now exposed to the "dry weathering" and deflation action in intensified form; perpendicular walls, suddenly passing from full sunshine to deep shadow, undergo great changes of temperature, and the wind rushes up and down the narrow corrie. Hence the opening is gradually widened, the deflation action being assisted by occasional cloud-bursts, and a *wady* is formed. Evidently the result must be very different from the work of rivers; there is here no system of main and tributary valleys, but a labyrinth of deep-cut channels which end blindly or open into wide amphitheatres in the higher ground.

Space does not permit us to do more than refer to Prof. Walther's discussion of the ultimate deposition of the material removed by deflation from the desert. Desert regions are usually bounded by steppes, where moisture and vegetation afford a more or less fixed

surface beyond the direct action of the wind; hence the soil of the steppe is in the first instance derived from the desert, and we arrive at the loess theory of von Richthofen. We can merely mention such matters as the occurrence of oases, temporary lakes, and the like, which are fully dealt with, and the special chapters on the flora and fauna of deserts, on salt deposits, and on fossiliferous regions. The book not only gives, in compact and satisfactory form, much that is new to the general student, but much that may be very suggestive in the study of regions in which æolian action may be of greater importance than we now suppose.

LAUNCH OF THE ANTARCTIC SHIP "DISCOVERY."

The special exploring vessel built for the National Antarctic Expedition was launched from the yard of the Dundee Shipbuilders' Company at Dundee on Thursday, March 21. The shipping in the docks was gay with bunting in honour of the occasion, the whalers *Balaena* (which visited the Antarctic in 1892–93), and *America* (formerly the *Eskimo*, and re-named since her purchase for the Ziegler Arctic expedition) being especially prominent. Before the launch an opportunity was afforded of inspecting the *Discovery* and observing her surprisingly graceful form externally, and the solidity and convenience of all her internal arrangements. No exploring vessel was ever more carefully planned or more conscientiously constructed.

At 3.30 p.m. the dockyard and the neighbouring esplanade were crowded with people, a specially invited party occupying the platform in front of the bow of the vessel. Mr. Low, the chairman of the Dundee Shipbuilders' Company, presented Lady Markham with a pair of gold scissors, with which she cut the white ribbon holding back a bottle of Australian wine wreathed in flowers, and allowed it to swing against the steel sheathing of the stem. As the bottle broke, Lady Markham named the ship the *Discovery*, and a few moments later the vessel commenced to glide along the greased ways, and, gradually increasing in speed, shot out into the Tay with a magnificent splash. Two tugs were in waiting, and proceeded to tow the *Discovery* into the dock, where she was berthed beside the 90-ton crane where her boilers were lying ready to be put on board. The appearance of the vessel in the water was singularly graceful when the extraordinary strength of her construction was taken into consideration.

Immediately after the launch a luncheon was given in the Queen's Hotel to a very large company, including most, if not all, of the arctic whaling captains at present in Dundee. The following ladies and gentlemen, amongst many others, supported the chairman (Mr. Low): Sir Clements and Lady Markham, Commander R. F. Scott, Lieut. and Mrs. Armitage, Lieut. Royds, Mrs. Royds, Dr. and Mrs. Koettlitz, the Lord Provost of Dundee, Sir Reginald Ogilvy, Prof. D'Arcy Thompson, Mr. Warington Smyth, Captain Wilson-Barker, Mr. George Murray (of the British Museum), Dr. J. Scott Keltie, Colonel Bailey, Dr. H. R. Mill, Mr. and Mrs. W. S. Bruce, and Mr. Cyril Longhurst.

The toast-list was a formidable one, involving no less than twenty-two speeches including replies. After the loyal and patriotic toasts, the Chairman proposed "Success to the *Discovery*, and the health of Lady Markham," to which Sir Clements Markham replied, observing that the *Discovery* was the sixth exploring ship of her name; the first explored Hudson strait in the seventeenth century, the second

explored Hudson bay, the third was the consort of Captain Cook's ship on his last voyage, the fourth was Vancouver's when he explored the Pacific coast of North America and circumnavigated Vancouver island, and the fifth took part with the *Alert* in the arctic expedition of 1875.

The Chairman next proposed the "Antarctic Ship Committee and Mr. W. E. Smith, Chief Constructor, R.N.," in replying to which, Sir Clements Markham, after expressing his regret at the unavoidable absence of Mr. Smith, said that the specifications prepared by the committee, though very long, could be summed up in Longfellow's lines—

> "Build us straight, O worthy masters,
> Stanch and strong, a goodly vessel
> That will laugh at all disasters,
> And with ice and whirlwind wrestle."

The company had turned out by far the strongest and most efficient scientific exploring vessel that ever left these or any other shores, and he proposed "Success to the Builders."

Dr. G. W. Baxter proposed "The Commanding Officers and Civilian Staff of the Expedition," to which Captain Scott replied, expressing his pride in the ship, and the determination of all connected with the ship to do the best they could, which was all that any man could promise.

Dr. H. R. Mill proposed "Success to the German, Swedish, and Scottish Antarctic Expeditions," all of which were being prepared, not to compete with one another for the first place, but to advance scientific knowledge by mutual co-operation. All were determined to do their best, and in the words of Robert Burns—

> "Wha does the utmost that he can
> Will whyles do mair."

Mr. W. S. Bruce, the leader of the proposed Scottish Expedition, replied, expressing his conviction of the need for many expeditions before the work of exploring the Antarctic Regions would be complete, and saying that the Scottish expedition was, after all, only a branch of the British, sailing under the same flag and fighting for the same cause—the advancement of science.

The other toasts were of a local or personal character.

THE MONTHLY RECORD.

EUROPE.

The Capture of the Meuse by the Meurthe.—The beheading of the Meuse by the Meurthe, and the consequent diversion of its upper waters to the Moselle, has long been regarded as one of the classical examples of river-capture. The historical evidence to which this interpretation was given by Wohlgemuth and Davis was mainly (*a*) the existence of a depression between Toul and Pagny-sur-Meuse; and (*b*) the presence of pebbles of granite and diorite, which must have come from the Vosges, in the older alluvial deposits of the Meuse, below Pagny. In a paper on the valley of the Ingressin, published in the January number of the *Annales de Géographie*, Prof. G. Bleicher, of Nancy, gives an account of a minute examination of this region, undertaken partly at the instance of the Société Belge de Géologie, Paléontologie et Hydrologie, which visited it in 1898, and as a result of his researches finds that the hypothesis of capture is open to grave objection.

The Ingressin comes from the Val de l'Ane and enters the Moselle at Toul, and Prof. Bleicher finds that it has never crossed the Val de l'Ane. The river-terraces of the Moselle do not reach the sill dividing the Ingressin from the Meuse; in fact, they cease 6 kilometres from Toul. The granite and diorite pebbles, which have certainly come from the Vosges, occur on the Meuse above Pagny as well as below it: they can be traced as far down as Mouzon, in the beds of watercourses which crossed a continuous slope from the Vosges to Lorraine in Pliocene times, and they are found more than 100 metres above the present valley-level. A boring, which is shortly to be made on the sill of the Val de l'Ane, should give a final answer to this question.

ASIA.

The Course of the Dihong.—An attempt is once more being made this year to effect a survey of the still unknown portion of the Sanpo-Brahmaputra—that in which the great river makes its way through the Eastern Himalaya to the plains of Upper Assam. Although all doubt as to the identity of the Tibetan Sanpo with the Brahmaputra was set at rest by the combined results of the journeys of the pandit A—K in 1882, and of Mr. Needham in 1885–86, a special interest still attached to this unexplored section, owing to the supposed mountainous nature of the country through which the Dihong here flows, and the fact that an enormous difference of level—placed at over 10,000 feet—existed between the lowest known point on the Sanpo and the emergence of the Dihong from the hills. The distance being only about 130 miles, it has been supposed that during this interval the course of the river must be marked by a succession of falls and rapids, while rumours of stupendous and impassable gorges have long been current. The new attempt to complete the survey of this section has been inaugurated by the Survey of India Department, by which two Gurkha surveyors have been specially trained for the work, the local arrangements for their journey being placed in the hands of Mr. J. T. Needham, political officer at Sadiya, whose active interest in the solution of the problem has long been well known. Details of the progress of the enterprise down to March last appear in the Calcutta *Englishman* for February 27 and March 29, 1901. The route selected by Mr. Needham is that on the right bank of the Dihong, for, though another is reported on the left bank, the right bank route appears to be the easier. The great difficulty in the way of exploration in this country has always been the opposition of the Passi-Minyong people, who fear the loss of their present lucrative position as middlemen between the British marts and the more distant tribesmen. The largest of their villages trading with British territory is that of Kebang, on the right bank of the Dihong, near its exit from the hills, and Mr. Needham hoped to secure the success of the enterprise by arranging with the headmen of the village for the reception of the surveyors, and their assistance on their further route. As regards the latter, it is surprising to learn that "the route to Gyala Sindong from Sadiya through Kebang is as easy as it is possible to conceive it, for to the north of Kebang there are no mountains to negotiate, the country being open and undulating, and the distance is absurdly small, being ten stages only." Beyond the Passi-Minyong country the people are Pangis, a cognate tribe, speaking the same language, and equally civilized. One and all are keen traders. The Tibetan frontier town, known to us as Gyala Sindong, is called by them Janbo, and the Tibetan country thereabout, Membo. A slave from Pang-kang, one of the villages on the route (all of which are on, or within sight of, the Dihong), who made his way a few years ago to Sadiya, told Mr. Needham that he had seen at Pang-kang a native in the British service, named Gumdan, who is identified with a surveyor named Guman Sing, sent some years ago to Gyala Sindong. The two Gurkha surveyors sent out from

Sadiya on February 13, proceeded by boat to Passi-ghat on the Dihong, and thence half a day's journey to the village of Gina. Here permission to advance was persistently refused, and the surveyors were forced to return to Sadiya. Mr. Needham sent the Miri interpreters, who had accompanied them, to demand an explanation, and these, after five days' negotiations, at last persuaded the people that their fears were groundless, and obtained promises of help. A second start was made on March 18, but with what result has not transpired.

The Maldives and Minikoi Island.—Mr. J. S. Gardiner, Fellow of Gonville and Caius College, Cambridge, who has lately visited the Maldives and Minikoi for purposes of research, has given a preliminary account of his work in two papers printed in the *Proceedings of the Cambridge Philosophical Society* (vol. xi. part i.). The first treats of the natives of the Maldives, and after briefly sketching the history of the islands and the dealings of Europeans with it (under which, however, no mention is made of Pyrard's sojourn in the group), the author states his conclusions as to the origin and affinities of the people, further details being reserved for the full report to be published in conjunction with Mr. C. F. Cooper. Mr. Gardiner found no evidence to which weight can be attached of the former presence of Buddhism, and though a study of the charms still found among the people might be thought to point to Brahmin influence, it is more probable, the writer thinks, that the lower features of Brahminism arose among people who gave rise to the Maldivans as well. The latter will not allow that any affinity exists between themselves and any other people, but Mr. Gardiner points to the close likeness between them and the Singhalese as indicating that the two races have been the result of a dichotomous branching of a common stem. The second paper, though likewise to be followed by a complete report, gives a detailed description of the structure and general features of the island of Minikoi, which, though constantly seen by passengers on the mail steamers to Colombo, is but rarely visited by outsiders. Mr. Gardiner sums up his conclusions as to the history of the atoll, which he is inclined to regard as *sui generis*, as follows: "The island would appear to have been formed entirely by either an elevation of the whole atoll, or more probably by a change of level in the surrounding ocean. The highest point of land is 19 feet above the low tide-level, and such a height is only found in one position and may be partly artificial. Allowing amply for denudation, it is fair to suppose a change of about 4 fathoms. When first the alteration in relative level took place, it is probable that the island extended round the atoll, except perhaps where the present ships' passage exists. . . . The sandy part of Minikoi island was probably mainly an after-formation, due to washing up from the lagoon." The reef is now growing outwards on every side, and the lagoon deepening and broadening. There is no evidence of a former central island, nor any indication of subsidence throughout the Laccadives. Mr. Gardiner suggests that Minikoi has grown up as a flat reef on some submarine mound, and that the numerous deep banks of the Laccadives represent incipient stages in the formation of reefs, later stages being seen in those above sea-level.

M. Bonin's Journey across Asia.—A connected narrative of the journey across Asia from east to west, carried out by M. Bonin in 1899–1900, which has been frequently alluded to in the *Journal*, appears in the second and third numbers of *La Géographie* for the present year. Leaving Peking in April, 1899, the traveller set himself the task of following the great silk route of antiquity between China and Europe, traversed in his time by Marco Polo. Passing through the important commercial centre of Kuku Khoto, or Kwei-hwa-cheng, which might, he says, be easily reached by a railway, M. Bonin struck the Hwang-ho near the ancient citadel of Tokto (the Tenduc of Marco Polo). After an excursion south of

the river, which, contrary to the general idea, he considers quite suitable for steam navigation,* the traveller navigated its course as far as Ning-hsia in Kansu, completing the survey which he commenced in 1896. The further march led by a hitherto untraversed route through the Ala-shan, many observations being made respecting the Eleuth Mongols of this region. The Ala-shan range was crossed by a pass not hitherto marked on the map. Water was found at certain spots, generally a day's journey apart, the total number of stages to Liang-chau being nineteen, of which the most difficult were those leading across the dunes of fine sand known to the Mongols as Tengri-irissu. Between Liang-chau and Kuku-nor, M. Bonin traversed the Nan-shan by a new route, making considerable additions to our knowledge of the orography of the range, together with a special study of the Tibetan tribe of the Sitopa, or Sipakia, descended from the ancient Tanguts. At the pass of Lao-ku-chau, which reaches the limit of perpetual snow, and is dominated by the high peak of Hai-tse-shan, the aneroid showed an altitude of over 16,000 feet. Other peaks, higher than any seen by Prjevalsky, were located during this part of the journey. At Kumbum, where he rested for a time, M. Bonin inspected the whole of the monastery, including the famous golden tower, the interior of which no traveller had previously entered. From Kuku-nor he struck north-east, crossing a snow-swept range and reaching the Poku-ho, which was found to rise at least half a degree further west than is shown on our maps. Another rectification made shortly afterwards was to the effect that the Richthofen range ceases west of the Kan-chau river, though hitherto shown as reaching further east. Between Kan-chau and Ngan-si numerous mines, recently opened or discovered, were seen. Beyond Ngan-si the main road was left, and a visit paid to the Sa-chau oasis, whence a reconnaissance was made to the north-west, to the Kara-nor, now situated a degree east of the old Kara-nor of the Chinese maps. As elsewhere in this region, desiccation seems to have progressed rapidly, for it was evident that the lake had once extended farther west. North of the lake a range of mountains was seen—the Pei-shan of Gromchevski. M. Bonin suggests that the true name is Pe-shan (Northern mountains), in contradistinction to Nan-shan (Southern mountains). From this point M. Bonin struck east into the desert, where his party met with difficulties from want of water. It was here that traces of the ancient road were discovered in the form of earthen towers, 30 feet high, at regular intervals of 5 li. They were once connected by a wall, now crumbled, which seems to have been built to protect the road from the drifting sand. Ruined blockhouses are also to be seen near the road. Returning south, M. Bonin followed the Astyn-Tag track, which, as he shows, cannot possibly represent the old highway of the silk merchants. The route diverged in places from that of Mr. Littledale, ascending to a higher level on the hills in order to reach a water-supply, the streams indicated by the English traveller being dry. From the Tarim valley, where he encountered Dr. Sven Hedin, M. Bonin crossed the Tian Shan by a new route to Urumtsi, the highest pass having an altitude of 12,660 feet. The rest of the journey was made over well-known ground by Kulja and Samarcand to Kraznovodsk, on the Caspian.

AFRICA.

Geology of Egypt and the Nile Valley.—Since the establishment, in 1896, of the Geological Survey of Egypt, a considerable amount of new information has been collected, which throws some light on the topography and mode of origin

* A mine producing excellent coal, which would be most valuable both for a railway and for steamers, occurs in the mountains near the river.

of the present surface features, as well as on more purely geological questions. Explorations have been made, in the Lybian desert and elsewhere, by Mr. H. J. L. Beadnell, who last year placed the results before the International Geological Congress at Paris, in a paper of which an abstract has been given in the *Geological Magazine* for January last. Geologically, the most important discovery is that of an unsuspected unconformity between the Cretaceous and Eocene deposits, the former having, in fact, been elevated into land, often with intense folding and faulting, and experienced considerable denudation before being once more submerged. An interesting present-day feature described is the remarkable narrow belt of sand-dunes which runs for considerably more than 200 miles in a straight course, with an even breadth of 3 miles, and with sides "as well defined as if drawn with the edge of a ruler." It starts apparently west of the oasis of Moghara, and runs south-south-east, or parallel to the normal direction of the wind, through the depression of Kharga, and between the Baharia oasis and the Nile valley. The steepest sides of the dunes are those facing west, which have an angle of 30°–31°. With regard to the origin of the remarkable depressions in the Lybian desert, such as those of Baharia, Dakhila, etc., Mr. Beadnell puts forward the theory that they are due to the denuding action exercised where the strata are soft, by changes of temperature, rain, and frosts, the resulting sand and dust being removed by wind. From geological evidence collected in the Fayum, he has proved that the ancient Lake Moeris occupied the site of the Birket el Kerun, his conclusions thus agreeing closely with those adopted by Major Brown from considerations of level. As regards the Nile valley itself, he holds that its formation was due, not to ordinary river-action, but to the same great series of earth-movements, of Lower Pliocene age, "which determined and formed the main physical feature of North-East Africa and part of Asia." This idea is not entirely new, but the confirmation of it thus supplied is valuable.

The Erlanger Expedition in North-East Africa.—Further news of this expedition (*ante*, p. 190), in the form of a letter from Herr Oscar Neumann written in December last, is given in the *Verhandlungen* of the Berlin Geographical Society (1901, No. 2). The route beyond Addis Abbaba led south along the chain of lakes, which, though visited or approached by so many travellers—Darragon, Wellby, Harrison, Leontieff—within the last few years, is still far from correctly shown on our maps. The surveys of Baron Erlanger and his party will, it seems, considerably modify the representation of this region. Between Lakes Zuai and Abaya, it is now stated that there are five and possibly six others, instead of the two shown by former travellers. Herr Neumann gives the names of four of the lakes as follows, beginning from the north: Shale (apparently the Hora of Wellby), Lauganna, or Korre (which, though said to be newly discovered, would seem to be the Lamina of Wellby), Abassi, and Daka—the two last forming a double lake. All are said to be remnants of a great Tertiary or Diluvial lake-basin, for between Zuai and Shale Herr Neumann discovered, 100 feet above the level of the Suksuk river, a deposit containing fresh-water shells. The lakes are in part connected by rivers or swampy channels, and the ground between them consists either of the former lake-bottom or of volcanic ranges which seem once to have existed in the form of islands. Many hot springs, similar to those mentioned by Böttego and Wellby, were seen near Lake Abassi. The letter was written from Abera, the newly built capital of the powerful chief Balcha, by whom the travellers were well received. He is lord of Sidamo, Jamjam, Badittu, and Amara, or all the country east of Abassi and Abaya. The former capital, Daresa, visited by Darragon, lies some distance to the south-west. The land is either elevated moorland or covered with bamboo forest. It is to be remarked that under the name Abaya

Herr Neumann apparently refers to the Pagade of Bòttego (Abai of Wellby), not the Abaya of Ruspoli and Donaldson Smith. The travellers were, at the time of writing, about to separate, Baron von Erlanger proceeding to Lake Rudolf, while Herr Neumann took the road for Fashoda.

Delimitation of the Franco-Italian Frontier on the Red Sea.—We learn from the *Politique Coloniale* (March 30, April 8–10) that a delimitation of the frontier between the French Somali Coast territory and the Italian colony of Eritrea has lately been carried out by a joint commission of the two Powers. The boundary starts from Cape Dumeirah, and runs south-west in such a way that the village of Raheita and the port of Assab fall within Italian territory. The country along the line was mapped under some difficulties, as it is described as a frightful desert without water or pasturage, making it dangerous to stray from the track in the labyrinth of steep hills through which the caravan route passes.

Visit to the Kirunga Volcanoes.—The first part of the new volume (1901) of the *Mitteilungen aus den Deutschen Schutzgebieten* contains an interesting account of a journey to the Kirunga volcanoes and Lake Albert Edward made in 1899–1900 by Herr von Beringe. It is accompanied by a map, which, owing to the scanty details yet published by other German travellers in the district, supplies valuable additions to our knowledge of its topography. Herr von Beringe's route led from Kifumbiro on the Kagera (destined, he thinks, to become the chief commercial centre of this part of Africa) in a westerly and south-westerly direction through the mountainous district of Mpororo, about which little definite information has hitherto been available, though the country was traversed in 1894 by Langheld and Richter (*Deutsches Kolonialblatt*, 1895, pp. 71, 109). Von Beringe's route seems, however, to have been a new one, as the natives had in many cases never seen a white man. The country is very broken, and the summits of the mountains reach a height of 5000 to 6000 feet, the valleys being always well watered. The people, who call themselves Wahororo, seem to be an aboriginal race, still untouched, in the west at least, by Wahuma influence. The hills are bare of trees, and are cultivated up to their summits. Between Mpororo and Ruanda the traveller passed through a lake district, the largest lake, for which only the generic term Mgesi was obtained, measuring some 15 miles by 2 or 3. Its shores are steep, and it seems to be of volcanic origin. The easternmost of the volcanoes, formerly known as Mfumbiro, but which the German traveller heard spoken of both as Kirunga and Muhawura ("far-seen"), falls to the east to two other lakes of considerable size. In this neighbourhood no trace of an escarpment to the rift-valley was seen, and in this respect the view of Mr. Scott Elliot finds confirmation. Herr von Beringe gives the native names of all the volcanoes, to most of which the generic term Kirunga is prefixed. Their number and relative positions agree fairly well with those shown by Mr. Grogan, but adjoining the highest of the series (Karisimbi) on the east, the German traveller places a table-topped summit (Visoko) not shown on Mr. Grogan's map. The old lava-fields adjoining the eastern volcanoes are exceedingly fertile and well-peopled, but the newer flows to the west are barren and waterless, and an attempt to pass to the west of Mount Namlagira (Mount Sharp of Mr. Grogan) had to be given up. The route to Lake Albert Edward passed east of Kirunga-cha-gongo and down the Ruchuru valley, while the return journey was made more to the east. The Kako, the principal headstream of the Ruchuru, was traced to a crater-lake, one of five by which the eastern Kirunga is encircled on the north, east, and south-east. The mountainous country on the north is populous and well cultivated, the inhabitants being Wahutu.

Explorations in Marocco.—The scientific results of his recent journey in Marocco are described by Prof. Theobald Fischer in the latest addition to the Ergänzungshefte of *Petermanns Mitteilungen*. After an introductory chapter and description of the outfit and mode of travel, Prof. Fischer gives a detailed narrative of the journey and of the scientific work of himself and his fellow-travellers, Captain E. Wimmer and Count Joachim Pfeil—a narrative of unfailing interest in its graphic descriptions of places and people, and in its skilful arrangement of matters important and unimportant to the scientific delineation of the region. The work forms an extension of the author's earlier researches in Tunis and Eastern Algeria (1886), and Western Algeria (1888), and a reconnaissance of one of the least-known regions of the world. A route-map accompanies the paper, and two photographs, one of an "Abrasionsterrasse" in the strait of Gibraltar, and another of an eroded valley at Meschrâ Ben Châillû, showing the horizontal bedding of the plateau, are reproduced. The "Vorland" region of the Atlas was crossed four times, on the lines Mogador-Marrakesch-Demnât, Demnât-Casa Blanca, Rabat-Fâs, and Fâs-Tangier. From the knowledge thus gained of its structure Prof. Fischer arrives, provisionally, at two main conclusions. First, the region is to be regarded as a true plateau; in nearly all parts, except in the immediate neighbourhood of the Atlas itself, the structure is that of horizontal beds of immense extent. Second, the plateau rests on the remains of an old worn-down mountain system. The existence of such a system has been recognized before, but Prof. Fischer shows that it occupies a much more extensive area than was supposed, and brings forward evidence that it never formed part of the Atlas, being indeed of much greater age, and appearing only at the surface where there has been great erosion and denudation. The life-history, which is fitly compared with parts of the Iberian peninsula, is briefly that of a fold-mountain system denuded by the action of the sea, covered over by sedimentary deposits, and then partly elevated. The erosion of the plateau thus formed, in which the action of wind must be regarded as an important factor, has brought the older formation to light in places where the more intense folding or greater resisting-power of its rocks left elevations at the earlier stage; these are now represented by the low ridges of the Djebilet and the Um-er-Rbia, which exhibit not only distinct surface forms, but the contrast of uninhabitable rocky districts in the middle of the habitable plain. Prof. Fischer does not commit himself as to the precise age of either the old mountain system or the superposed strata, and criticizes somewhat severely the international geological map of Europe with regard to this region. He is inclined, however, to agree with von Fritsch that the older formation is Devonian, and believes that, with certain exceptions, the younger belongs to the Cretaceous period. Beyond the plateau is the piedmont region of the sub-Atlas tableland, a strip 30 to 40 kilometres wide, closely following the trend of the mountains, and crossed by a number of mountain streams which eventually unite to form the Tensift and the Um-er-Rbia, the two rivers of the plateau. The surface of the tableland consists of diluvial deposits of varying texture. While the Atlas "Vorland" thus consists structurally of two parts, the plateau and the tableland, from other points of view it is more conveniently divided into three; the sub-Atlas belt of irrigated oases, coinciding nearly with the tableland, the belt of steppe-land, and the coast belt of cultivated land. The first is a region capable of considerable development; by extension of the irrigation system the production of crops could be largely increased. The second includes part of the plateau and exposed older rocks, and is a region of deficient rainfall, which is nevertheless capable of supporting quantities of live stock, even in summer. The third follows the coast and extends inland for a distance of 50 to 70 kilometres;

a region of exceedingly fertile soil, and in most years of quite adequate rainfall. As the result of his explorations, Prof. Fischer concludes generally that in respect of position, climate, fertility, and possibly also of mineral wealth, Marocco is the most valuable of the three Atlas countries, and that it has a greater future before it than either Algeria or Tunis.

Natural Resources of Tripoli.—A recently issued Foreign Office Report (Misc. Ser., No. 527) contains much useful information on the agriculture and natural resources of the Vilayet of Tripoli. Of the total area of 410,000 square miles (apart from the sub-province of Barka), about three-fifths are unproductive, leaving about 164,000 square miles of more or less fertile and productive soil, almost all situated between the sea and the ranges of limestone hills which mark the beginning of the southern plateau. The most fertile portion extends about 150 miles from Cape Misurata on the east to Zarvia on the west, with a breadth of 40 to 60 miles. The total population of Tripoli proper is estimated at 900,000, the majority inhabiting the coast lands and the wadis and uplands of the hills. During the rainy season, which lasts from November to March, about 19 inches of rain falls, but this is, unfortunately, so unevenly distributed, that only four good harvests out of ten can be reckoned on. At present nothing is done to utilize for irrigation the temporary torrents from the hills, which are allowed to run to waste into the sea or to form unhealthy marshes along the coast; and although there is abundance of underground water almost everywhere at little depth, no artesian wells exist, the only irrigation being by water drawn from wells by ox or camel. Of the cultivable land, it has been estimated that from 80 to 90 per cent. is not under cultivation, being allowed to remain waste through scarcity of population and lack of water, and the absence of inducement to extended cultivation due to the expense of transport in a country without roads, carts, or railways. Of the agricultural products, barley is far the most important, forming the staple food of the people. Its harvest forms the mainstay of the country, the prosperity of which for the time being depends on the quality of the crop. A fairly good harvest yields perhaps 1,400,000 bushels, a phenomenal one 2,000,000. The barley is much sought after for malting purposes, the export being principally to Great Britain; but, owing to the rarity of good harvests, this is very limited. In the years 1886–99, the total imports exceeded the exports. Other crops are wheat, dates (largely consumed in case of a failure of the barley crop), olives, oranges and lemons, madder and henna, all of which (except wheat) are exported to some extent, the remaining exports being made up principally of esparto grass, cattle, eggs, wool, skins, and hides. The total imports and exports during the last ten years have averaged between £300,000 and £400,000 yearly, the excess of total exports over exports of the natural products of the vilayet (the latter about £200,000) being made up by the caravan trade in ivory, feathers, and skins. This is probably doomed to diminution, if not extinction, in the future. To sum up, the productive power of Tripoli in excess of its own consumption is represented by a yearly value of about £160,000 only, more than half of which is the produce of a weed, incapable of reproduction, and therefore destined to ultimate extinction.

Trade of the Somali Coast Protectorate.—According to the report of Lieut.-Colonel H. Sadler on the Somali Coast Protectorate for 1899–1900, issued in January last, several adverse circumstances combined to affect the trade of the Protectorate during the year. Disturbances continued in the eastern part of the country which seriously hampered trade with the Dolbahanta country and Eastern Ogaden. The country suffered from drought in the first part of the year, and afterwards from heavy rain, which caused loss of live stock. In spite of these and other disadvantages, it is reported that during the year under review

the trade of the Protectorate reached its highest figure, exceeding the returns of the previous year by a little over 50,000 rs. An increase in imports is recorded, particularly in American grey shirting and silks. A greater demand was also shown for rice as a staple article of food; exports decreased in value owing to the slackness of the Harrar coffee trade. It is noted that the Zaila import trade with Harrar has steadily progressed. The total value of goods imported into Zaila was 34,71,904 rs., against 28,09,939 rs. in the preceding year, and the total value of exports was 30,13,712 rs. as compared with 33,23,261 rs. of the previous year. An increase in value is shown among the following articles of export: gum, skins, ivory, ghee, and pearl shells. The total value of the trade of Berbera and Bulhar for the year as reported by the vice-consul is as follows: import, 33,15,651 rs.; export, 28,71,962 rs.; total, 61,87,613 rs., showing an increase on the whole of 2,45,355 rs. on the previous year's total of 59,42,258 rs. With regard to shipping, a new line of steamers has been opened with the Persian gulf. Zaila, as a port of commerce, appears to greatly need additional means of communication with other ports. It is said to be entirely dependent on one small steamer, which calls once a week, afterwards proceeding to Berbera, whence it returns to Aden. Thus letters for Europe posted in Zaila take five days to reach Aden, a distance of 120 miles. There is no telegraphic communication, messages having to be conveyed along the coast of the Protectorate either by the above-mentioned steamer or by camel post.

AMERICA.

The Yellow Head Pass Route across the Canadian Rockies.—A recent report by Mr. James McEvoy, of the Geological Survey of Canada, on the country traversed by the Yellow Head pass across the Rocky mountains—the route originally chosen for the passage of the range by the Canadian Pacific Railway—adds considerably to our knowledge of the districts on the headwaters of the Athabasca and Fraser rivers. From Edmonton on the North Saskatchewan to Brulé lake on the Athabasca the route crosses a gently rolling plain, with burnt or green woods of cotton-wood and spruce, and frequent muskegs and bog-holes. The Pembina river, where crossed, flows in a valley excavated to a depth of 250 to 300 feet, but the McLeod, though containing at the present day a far greater volume of water, flows only 90 to 100 feet below the level of the country. The watershed between the McLeod and the Athabasca is formed by a slightly rolling ridge, which, though rising gently, attains an altitude 917 feet higher than the summit of the Yellow Head pass. The valley of the Athabasca is wide and flat, and owing to its comparatively low altitude (3000 feet), which emphasizes the effects of the Chinook winds descending from the mountains, has a drier climate than the country further east. Until Prairie creek, a little below Brulé lake, is reached, there is no approach to mountainous conditions, but beyond it Folding mountain, the first foothill of the Rocky mountains, rises up, followed by high rugged mountains with vertical cliffs, leaving a flat-bottomed valley 1 to 2 miles wide, through which the Athabasca winds in a network of sloughs. The trend of the ranges is S. 60° E. to S. 70° E., following the strike of the rocks; and the confluent streams, having the same direction, are generally arranged in pairs, each occupying one continuous valley at right angles to the main valley. One tributary, the Maligne, flows through a remarkable gorge, almost closed in at the top. The mountain slopes are for the most part bare of trees, which, except in sheltered valleys, do not ascend above 5000 feet. The trail reaches the pass by the valley of the Miette, which at high stages sends some of its water in the opposite direction to the Fraser. Flowing between the Selwyn range on the left and the Rainbow mountains on the right, the Fraser is joined from the north by the Grand Fork, looking up which a most

imposing view, dominated by Robson peak (13,700 feet), the highest known peak in the Canadian Rockies, is obtained. A little below this the river enters the great longitudinal valley, which, though occupied by different streams, preserves its main characteristics from the 49th parallel to this point and beyond. South of the Fraser it is occupied first by the McLennan, a tributary of the Fraser, and afterwards by the Canoe river, which flows in the opposite direction to the Columbia. The mountains in this direction are rugged and contain large glaciers. Erosion is going on very rapidly, and every stream is choked with mud. The climate of the valley is drier than that of the upper Fraser, but in the richer and lower lands there is moisture enough to produce good crops, and at least a fourth of the area would make rich farming land. The report also describes the plateau country east of the range, at the headwaters of the Brazeau, Pembina, and McLeod, and gives full details of the geological structure of the country.

Drying up of the Great Salt Lake.—It is stated in *Science* that measures are urgently called for to avert the disaster with which the agriculture of Utah is threatened by the imminent drying up of the Great Salt Lake. A scheme which meets with general favour is one suggested by Mr. Marcus E. Jones, who proposes to bring water into the great basin by means of a canal to be constructed from the headwaters of the Snake river. The matter would, it was thought, shortly come before the Utah legislature.

Colonel Church's "Geography of South America."—In our last number, in the general map illustrating the "Outline of the Physical Geography of South America," by Colonel Church, an error of the engraver was made in the boundary-line

POLITICAL BOUNDARY BETWEEN BOLIVIA AND PARAGUAY.

between Bolivia and Paraguay. It is not the red line marked on the map, but the dotted one running directly west from the Apa. This is the line tacitly recognized between the two countries, although it has never been acknowledged by treaty. The error will be found corrected in the accompanying small map, which we have had prepared for the purpose of accuracy in the matter of limits between the two countries.

A Chilean Mining Department.*—The excellently got-up work of Herr Darapsky on the Chilean Department of Taltal is a valuable contribution to our knowledge of the west coast regions of South America. The author is a mining engineer, who, during a period of more than ten years, has traversed the northern portion of the old province of Atacama in all directions, and made the best use of the opportunities of scientific observation thus afforded him. While studying, for technical purposes, the geology of the country, he has not neglected the wider aspects of physical geography concerned with the present surface features in their genetic and other relations, and the result is an unusually clear and comprehensive picture, presented in chapters ii. and iii., of the two main natural divisions into which the whole of this region may be divided—the desert and the *puna*. In the department of Taltal, the dividing line, formed by the first continuous chain of the Andes, runs in about 69° or 69° 15′ W., the high Cordillera region to the east of this line being now generally known as *puna*, while the desert is the lower but still fairly elevated tract between the Cordillera and the coast, from which its outer edge rises like a steep wall. Herr Darapsky's account of the *puna* region, with its numerous salt lagoons and volcanic peaks and ridges, appeared some time ago in its essential features in the *Zeitschrift* of the Berlin Geographical Society, and has already been alluded to in the *Journal* (vol. xv. p. 538). A valuable chapter in the present work is that on the climatic conditions of the department, which in their striking contrasts and anomalies present a close parallel with those of German South-West Africa. The next three chapters are devoted to a description of the mineral riches of Taltal, especially the deposits of saltpetre, the origin of which is carefully discussed. Herr Darapsky thinks that the present deposits are but the remnants of a former more extensive covering, which was formed at a definite geological period, though certainly not, as was once thought, from a general covering of the surface by the waters of the sea. The fact that these deposits have been better preserved here than anywhere else in the world is to be mainly ascribed to the very extended period through which a dry climate has prevailed. The wealth of Taltal in metals, which include almost all the useful kinds known, is dealt with in the eighth chapter. The work contains a striking series of illustrations reproduced by photogravure, and an abundant supply of maps, sections, and panoramas.

Belgian Enterprise in the Tocantins Basin.—The newly awakened enterprise of the Belgians in Africa and the Far East is now to be extended, as we learn from the *Mouvement Géographique* for March 17, to South America, a great project having been set on foot for the exploitation of the basin of the Tocantins in Brazil. The upper courses, both of the Tocantins and its great tributary the Araguaya, are shut off from intercourse with the coast by reason of the falls and rapids which obstruct their lower courses as well as the united stream below the confluence. This defect, which has much impeded the development of the state of Goyaz, it is proposed to remedy by the construction of a railway from Alcobaça to Praia da

* 'Das Departement Taltal (Chile). Seine Bodenbildung und Schaetze.' Von L. Darapsky. Berlin: Reimer, 1900.

Rainha, parallel to the lower Tocantins, and by the removal of obstructions to navigation between Praia da Rainha and Porto Nacional on the Tocantins, and Santa Maria on the Araguaya, so that both rivers will be accessible to steamers drawing 1·3 foot. The company formed so far back as 1891 for the purpose of carrying out these objects, under the name "Companhia Viação Ferrea e Fluvial do Tocantins e Araguaya," has lately, for the purpose of raising the necessary capital, decided to make over the valuable concessions granted by the Brazilian Government to a Belgian company, which is commencing operations by the despatch of an exploring expedition under M. Léon Thierry, whose staff was to leave Antwerp on March 18. M. Thierry has previously been connected with the "Société du Haut Congo."

AUSTRALASIA AND OCEANIC ISLANDS.

Distribution of Art in Oceanea.—Under the title of "Die Kulturformen Oceaniens," Herr L. Frobenius contributes a series of three valuable papers to *Petermanns Mitteilungen* for September, October, and November, 1900 (vol. 46, Nos. ix., x., xi.). They form a continuation of the studies of cultural appliances which appeared in vol. 41 (1896) of the same periodical, and are of the same comprehensive character. Here Oceania, as is usual with foreign writers, is taken in its widest sense, comprising "Indonesia," that is, Malaysia with the Philippines in the west, Australia in the south-east, Micronesia in the north-east, and Melanesia with New Guinea in the east. From Indonesia, presumable centre of development of the cultural forms, three main highways, here called "axes," lead to Australia ("southern axis"), to Micronesia ("northern axis"), and along the New Guinea coast to East Melanesia, thence ramifying over the whole of Polynesia ("central axis"). To the cultural forms specially distinctive of the southern and central zones are applied the terms "Nigritic" and "Pre-Malay" respectively, all the rest being called "Malayo-Asiatic." This terminology cannot be regarded as satisfactory—indeed, is open to more than one serious objection, and the author tells us himself that the expression "Malayo-Asiatic" especially was adopted with great reluctance for want of a better. It seems to exclude Nigritic forms, which are, nevertheless, in some respects typical of the northern zone, and more particularly of Indonesia, where they originated. But once the terms are defined, all confusion is removed, while the whole subject is treated with a clearness and accuracy which are beyond all praise. In the first paper are described the various kinds of stone axes, of drums, weaving materials (cotton and all sorts of vegetable fibres), houses, river and sea craft, characteristic of the several cultural areas. The second is occupied exclusively with missiles, and especially the mechanical contrivances, such as the sling, bow, and blowpipe, by which stones, darts, spears, arrows, and the like, are hurled against the enemy. Weapons thrown with the hand—clubs, boomerangs, and other kinds of throwing-sticks—are also dealt with, and a special section is devoted to the historic evolution of all these implements. In the third paper a very full account of the endless varieties of shields and bucklers occurring in the Oceanic domain is followed by a highly instructive essay on the numeral systems of the Oceanic peoples, after which comes a very clear account of the different processes and appliances for kindling fire. The whole subject is dealt with in considerable detail, and in such perspective that, as when surveying the Pitt-Rivers collection at Oxford, the reader is often enabled to see the natural development of advance from more primitive types—the passage, in the language of evolutionists, from the homogeneous to the heterogeneous. This is specially seen in the careful treatment of the shield and of the boat, to which great attention is rightly paid, as in no

other field of human activities can these appliances be more conveniently studied. Here we plainly see how the handle of the shield was the determining motive of many later modifications, and how the floating log passed through the dug-out to the single and double Polynesian outrigger, the decked vessel, the prau and sailing-ship. The sail itself is separately discussed, its development from the triangular form attached on one side to the mast, to the square form as in the Chinese junk, and other later improvements, being diligently followed, so to say, from creek to creek, from bight to bight, from the inland seas to the open waters of this insular world. The series of monographs, as they may well be called, concludes with a few summary remarks on the cultural elements of the three specified zones, the object being to determine as far as possible the actual range of the types specially characteristic of these several zones. Thus the boomerang and allied forms of throwing-sticks, all turning on their axis in flight, some mere playthings, others hunting or offensive weapons, are shown to extend in Australia as far south as about 15° 30′ S., north-westwards to the Aru islands (the palu-palu), and eastwards to the New Hebrides (the curious kavas made of coral, but bent like a boomerang, and about 18 inches long). Although the most recent in their evolution, the Malayo-Asiatic culture forms are found to be the most widely distributed, but everywhere associated with earlier, and in some cases even with the most primitive, types. Thus they occur in Indonesia in juxtaposition with still surviving early Asiatic, pre-Malay, and Nigritic implements and processes. They range also into Micronesia and Polynesia, but as a rule thinning out in the direction of the east. An interesting case is the potter's art, which flourishes in Indonesia, is still practised in the Pelew group, but has already died out in Yap, where, however, clay vessels are still familiar objects, while east of this island all traces of the art and its products have long disappeared. The papers are accompanied by eighteen small-scale maps, illustrating the distribution of the objects, etc., described.

Memorial of the Observation of the Transit of Venus, 1769.—The memorial erected by Captain Cook at Tahiti, after the observation of the transit of Venus during the navigator's first voyage, has recently been restored through the joint efforts of the Royal Society and our own Society. A plate has also been fixed with the following inscription: "This memorial, erected by Captain James Cook to commemorate the Observation of the Transit of Venus, June 3, 1769, was restored and fenced round, and this plate was placed here by the Royal Society and the Royal Geographical Society in 1901."

POLAR REGIONS.

Launch of the German Antarctic Ship.—The ship which has been specially built for the German Antarctic Expedition at the Howaldt shipbuilding yard at Kiel, was successfully launched on April 2 in the presence of a large assembly, the ceremony being performed by Baron von Richthofen. The ship has been named the *Gauss*, after the great German mathematician, whose work on Terrestrial Magnetism, published in 1838, gave the impetus to antarctic research which had its outcome in the three great expeditions of Ross, D'Urville, and Wilkes. The *Gauss* is slightly smaller than the *Discovery*, the displacement being 1450 tons as compared with 1750 in the case of the British ship. The length between perpendiculars is 151 feet, and the beam 35, this last being 1 foot greater than that of the *Discovery*. The ship has triple-expansion engines of 300 indicated horse-power at ordinary, or 500 horse-power at forced, draught, giving an estimated speed, with a steam-pressure of 26½ lbs., of 7 knots. As in the case of the *Discovery*, there is an outer and inner hull, the former having a thickness of 14 inches at the water-line. It is in three layers, the outermost of greenheart,

the two others of oak. The ship has been built with a view to accommodating a crew of thirty to thirty-two persons, with stores for three years, fifty dogs, and complete equipment for the scientific work contemplated. Among other apparatus will be a windmill, a naphtha boat, a captive balloon, and materials for the construction of a dwelling-house and four observatories for use at the winter station. In the interest of the magnetic observations, iron has been employed sparingly, and even so coated with zinc, copper taking its place as far as possible. The ship will be lighted by electricity, and warmed by steam-pipes. It will have considerable sail power, to which the use of steam is regarded as merely auxiliary.

Communicating with Peary.—We learn from the Brooklyn *Standard Union* for March 29 that arrangements have been made by the Peary Arctic Club for the despatch, for the second year in succession, of letters to Peary, now spending the third year since starting on his present expedition. The mail had been forwarded to Dundee for despatch by the whalers from that port, five of which are proceeding this year to the Smith sound region. Five copies of the letter have therefore been sent, and it is hoped that one, at least, will safely reach Cape York, from which point it will be carried north by the Eskimo.

Explorations in Spitsbergen: Erratum.—On p. 434, *ante*, line 14, the height of the pass ascended by the Swedish explorers should be 4166 feet, not 8860 feet. The general direction was east from the head of East fiord, though the last part of the route was south-east.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Snow-waves.—Mr. Vaughan Cornish has returned from an expedition in search of snow-waves in Quebec, Manitoba, the North-West Territories, and British Columbia. These waves were found to be well developed on frozen rivers and lakes, and on the open prairie, where photographs and measurements were taken. They are produced without the intervention of any obstruction, and sometimes occur in groups or trains of waves comprising a hundred succeeding ridges. Their movement is sufficiently rapid to be readily visible. In certain conditions of the snow true ripples are also formed which are similar to the ripples produced by wind in loose dry sand. In both ripples and waves the steeper face is on the lee side. In moist or coherent snow, such as usually falls in England, the wind carves the surface into ridges which have their steep face on the windward side.

Zoogeographical Regions.—A paper by Dr. Arnold Jacobi in the *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* (xxxv., 1900, pp. 147–238) contains a critical review of recent work dealing with the distribution of animals. No faunal division of the world will hold for all groups of animals, because these have appeared at very different ages, and the lands have undergone great changes of outline since the earlier forms first flourished. Confining attention to mammals and birds, the world consists of three great realms—Notogæa, Arctogæa, Neogæa, which correspond with the three chief centres of their development. Many striking facts in present distributions cannot be fully explained by taking into account only migrations and climatic conditions, but should also be studied with reference to possibilities of food-supply. For the division of the three realms into regions, statistics of mutually common or exclusive species are not so important as considerations of genetic relationships. Dr. Jacobi adopts the holarctic region, and calls North America south of 45° a neoboreal region, which he includes in the Neogæic realm. He points out that recent researches have shown that Asiatic species are more important in the Malay archipelago than Australian ones, and that the line separating Arctogæa from Notogæa must be moved eastwards from Lombok

strait to the Molucca, Banda, and Timor seas. We cannot give up Wallace's line without a sigh of regret. Might not the name be retained for the boundary between Arctogæa and Notogæa? Dr. Jacobi makes a special study of several regions, and summarizes the results of recent investigations in them as follows: I. There are a number of characteristics common to the Ethiopean and Oriental regions, which owe their origin in most cases to the latter; but there is no proof of a former Lemurian continent, which formed a bridge by which the animals and plants passed between India and Africa. II. There is much in common between the forms, or at least between the systematic groups, of animals and plants in the high mountains of Africa, Europe, and Asia. III. The high mountain fauna of the Philippines has a marked sub-arctic character, which is obviously connected with that of the Himalayas. Traces of this fauna are also found in the mountains of the Greater Sunda islands. Probably these types were driven from India towards the Malay archipelago by a cold period. IV. The great mountain mass of Central Asia is distinguished by an astonishing richness in peculiar types, which is all the more remarkable when we consider the unfavourable environment. It appears to be the distribution centre of many groups. V. The fauna of Japan has three constituent parts—tropical, older Manchurian endemic, and younger holarctic—whose distribution over the archipelago throws light on its geological history. VI. After the great Ice Age Europe received its plants and animals from three sides, and there were new immigrations from the south and especially from the east, owing to the gradual equalizing of the environment in Europe and Western Asia. VII. The avifauna of the Galapagos clearly shows that the differentiation following physical separation, or isolation, in Moritz-Wagner's sense, is the first and essential condition for the formation of new species. A discussion of fifteen migration regions, which are shown on the map, is followed by a study of the distribution of jays (*Garrulus*) and bullfinches (*Pyrrhula*), illustrated by two maps. The areas of distribution of organic forms are grouped into universal, zonal, littoral, marginal, insular, fluviatile, and vertical; and the areas where closely allied types live without sexual or social intercourse with each other in the same region, distinguished from those where one form is restricted to a very limited district, and from the intermediate discontinuous distribution, *e.g.* of the tapirs. A brief note on the form of the bio-geographical region closes the paper.

GENERAL.

Malarial Infection of Europeans.—A further instalment of reports to the Malaria Committee has been published by the Royal Society in the form of a paper, with two short notes appended, by Mr. S. R. Christophers and Dr. J. W. W. Stephens. The main paper consists of a discussion of observations and experiments showing that the native is the prime agent in the malarial infection of Europeans. The authors found, firstly, that in all the native villages examined, 50 to 90 per cent. of the children were infected with malaria, and a considerable proportion of the infected children contained crescentic bodies, which rapidly took the form requisite for the transmission of human malaria to the mosquito. Secondly, in all the villages anopheles were present, even when breeding-places had not been in existence for varying periods up to three months. A certain proportion of the anopheles found were always infected with the mosquito phase of the parasite, and not only each village as a whole, but with rare exceptions each individual hut, contained both infected children and infected anopheles. These conclusions, which are here chiefly based on observations near Accra, are supported by observations made by the authors in various regions in British Central Africa, Sierra Leone, and the Gold Coast, and they therefore probably prevail universally

throughout tropical Africa. They lead at once to a result of the highest importance—that Europeans can escape infection by strict avoidance of native villages and huts. Settlements and towns must have no adjoining native quarters, and travellers must camp and sleep in places remote from human habitation.

Admiralty Chart Agency.—It may be of use to Fellows of the Society to mention that Mr. J. D. Potter, the agent for the sale of Admiralty charts, has removed from 31, Poultry, to 145, Minories, and that the latter is therefore now the address from which those charts are to be obtained.

OBITUARY.

Professor Paul Chaix.

We regret to announce the death, which occurred on March 28, at the age of ninety-three years, of our oldest Hon. Corresponding Member, Prof. Paul Chaix, of Geneva, whose name has long been a familiar one in geographical circles. His connection with our Society dates back almost to its foundation, his election as Corresponding Member having taken place in 1837, or no less than sixty-four years ago.

Paul Chaix was the son of Georges Chaix, whose family had relations both with Dauphiné and with Spain; his mother belonging to an old family in Geneva, to which city the family removed from Dauphiné in 1816. After a distinguished career at the Geneva Academy, he became tutor in succession to various young men of note, including the Duke of Richmond, who was his pupil (in London and at Goodwood) from 1829 to 1832. In 1836, after completing his studies at Paris, Chaix returned to Geneva, and was appointed Maître de Géographie et d'Histoire at the Industrial College, geography being a subject which had already attracted his attention. In 1839 the first edition of his 'Précis de Géographie Élémentaire,' which has now reached its fourteenth edition, appeared, followed two years later by his 'Atlas de Géographie.' In 1846 the revolution at Geneva deprived Chaix of his principal functions, and he occupied the leisure thus obtained in a journey to Egypt (1846–47), and in studies on the history of South America in the early days of the conquest, on which he published a work in two volumes in 1853. In 1868 he became Professor at the Gymnasium at Geneva, and in 1872 Honorary Professor at the University. He retired from active work in 1882, but continued to give scope to his fondness for foreign travel until several years later.

In addition to the works already mentioned, Prof. Paul Chaix published, during his residence in London, his 'Carte de la Savoie,' and in 1847 a series of 'Lettres des Bords du Nil,' contributed to the *Bibliothèque Universelle*. His 'Hydrographie de l'Arve' may also be specially mentioned. Besides these, he contributed to various reviews and journals, especially to *Le Globe*, the journal of the Geographical Society of Geneva, a large number of smaller articles. To our own Society he presented several papers, published in the *Journal* between 1849 and 1857, including notes on the Nile and on Hannibal's passage across the Alps.

Prof. Paul Chaix married in 1848, and had one son, Prof. Emile Chaix, also well known as a geographical writer, and three daughters, all still living.

Major-General G. H. Saxton.

The death has lately occurred of Major-General Saxton, formerly of the Indian Army, who, during his service in India in the third quarter of the nineteenth

century, was well known for his excellent work in connection with the Survey of India. Born in 1820, and educated at a private school in Shropshire, George Harper Saxton obtained a cadetship in the Madras army in 1837, and soon gained promotion, distinguishing himself especially by his linguistic proficiency. After holding for a time the adjutancy of his regiment, the 38th Madras Native Infantry, he was, in 1849, selected to take charge of the Ganjam survey party, one of the oldest branches of the Survey of India, and remained in this important position until his retirement, under the age rule, in 1874. During this time the whole province of Orissa was mapped under his auspices, the work being carried out with great success and thoroughness. Among other work which fell to his lot was the settlement of various boundary disputes between native states. Since his retirement he had lived at Emsleigh, Exeter, taking an active interest in various local committees, and giving much of his time to correspondence on the subject of bimetallism, in which he took a warm interest, and on which he published several pamphlets. He became a member of our Society in 1898.

Henry Schlichter, D.Sc.

It is with great regret that we record the premature death, from the results of malarial fever, of Dr. Henry Schlichter, well known to our readers as a zealous student of African geography, past and present. We believe that Dr. Schlichter never fully recovered from the effects of illness contracted during his expedition to South Africa in 1897–98, but though he travelled in the hope of benefiting by a change of air, he finally succumbed at Waiblingen, Würtemberg, at the beginning of April last.

Dr. Schlichter was born and educated in Germany, but after graduating at Stuttgart University, he came to this country and eventually became naturalized as a British subject. For some years he held the post of consulting scientist to the Jaeger Company, but he devoted much of his time to study and research on geographical questions, especially those connected with Africa and the history of geography generally. In 1891 he read before our Society an important paper on Ptolemy's 'Topography of Eastern Equatorial Africa,' in which he showed that the descriptions of that geographer were quite capable of being fitted in with the facts brought to light by modern discovery, and were therefore based on actual knowledge. A nearly allied subject to which he paid special attention was that of the ruins indicating the existence of ancient gold-mines in South-East Africa, and on this he contributed several papers, both in *Petermanns Mitteilungen* and in the *Geographical Journal*, after the expedition of Mr. Theodore Bent had re-directed public attention to the problem presented by the ruins, throwing valuable light on the ancient commercial intercourse between Arabia and Eastern Africa. About the same time he directed his attention to the more practical question of the employment of photographic processes by explorers for purposes of survey—a method which has since reached so important a development. A preliminary paper by him attracted considerable attention at the meeting of the British Association in 1892, and the method was afterwards more fully described in a paper published in the *Geographical Journal* in November, 1893.

In 1897, Dr. Schlichter found an opportunity of continuing his researches on the gold-mining ruins at Zimbabye by personal investigation on the spot, having received the appointment of geologist to the British South Africa Company. During his examination of the mineral resources of the company's territory, he traversed some little-known districts in Matebeleland and Mashonaland, making for the first

time a careful examination of the ruins in the Mombo district of the former, as well as of the better-known ruins at Zimbabye and elsewhere. The results of these journeys were placed before our Society in a paper read in February, 1899, and published in the *Journal* for April of that year. During this expedition Dr. Schlichter discovered considerable deposits of gold, and he was, up to his death, a zealous champion of the prosecution of mining enterprise in Rhodesia.

CORRESPONDENCE.

Nomenclature of Spitsbergen.

In view of the vexed question of the correct nomenclature of Spitsbergen bays and capes, the following list is worth putting on record. I copied it in the Record Office, where it is preserved in 'S.P. Domestic, Interregnum,' vol. 179 (January, February, 1658), No. 11 (2). It is annexed to a report of a discussion in the Council of State, relative to whaling matters, on December 14, 1657. It is therefore unusually authoritative. The latitudes will be found very inaccurate.

"The Names of the Severall Harbors in Greenland and the Degrees of Latitude.

	Degrees.
Point Looke Out being in the height of	76½
Hornesound and Mottle Bay	77
Bell Sound and Bottle Cove	77½
Greenharbor and Port Nick	78
Osbornes Inlett	78⅔
Fowle Sound	79
Cove Comfortlesse	79¼
Deere Sound	79½
Crosse Road	79⅔
Crooke Haven	79¾
Knotty Point	79⅔
Maudlyn Sound	79⅔
Faire Haven	79⅔
Foxes Point, etc.	80
Foreland	79
Sir Thomas Smith's Bay	78⅔
Pudding Bay to the Eastwards	77
Deicrowes Bay and others	77¼
Duckes Cove	77⅓
Hunting Bay	78
Potty Harbor	77"

Point Look-out is South cape. Mottle bay is a cove in the north side of Horn sound. Bottle cove (Willem van Muyden's haven) is identified from Pelham's 'God's Power and Providence' as a cove open to the south-west in the north shore of Bell sound, outside Axel island. Port Nick is Safe haven. Osborne inlet is St. John's bay. Cove Comfortless is English bay. Fowl sound is Foreland sound. Deere sound is King's bay. Crookehaven may be Hamburger bay. Knotty point is the point between Magdalena (Maudlyn) bay and the South gat. Foxes point is Flat hook. Sir Thomas Smith's bay is the north end of Foreland sound. I cannot identify Pudding bay (in Wybe Jans water). Deicrowes bay is in Edge island; so is Duke's cove (see *Geographical Journal*, June, 1900, p. 631, *note*). I cannot identify Hunting bay and Potty harbour.

Martin Conway.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1900-1901.

Ninth Ordinary Meeting, March 25, 1901.—Sir T. H. HOLDICH, R.E., K.C.I.E., C.B., Vice-President, in the Chair.

ELECTIONS.—*Count Lutzow; Victorino de la Plaza; John Waite.*

The Papers read were:—

"Journeys in the Linyanti Region." By Percy C. Reid. "Exploration and Survey in the Sobat Region." By Major H. H. Austin, R.E.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce.
C. Rd. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
k. u. k. = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. = Memoirs, Mémoires.
Met. = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Alps. **Coolidge.**

Climbs in the Alps made in the years 1865 to 1900. By W. A. B. Coolidge. [100 copies privately printed.] Size 8 × 5, pp. 24. *Presented by the Author.*

This is merely a list of the climbs made by the author.

Alps. *Jahresb. G. Ges. München* (1898-99): lxxiv-lxxvii. **Finsterwalder.**

Ueber die neuesten Ergebnisse der Gletscherforschung in den Ostalpen. Von Prof. Dr. S. Finsterwalder.

Austria—Bosnia, etc. *B.G.S. Philadelphia* 3 (1901): 21-50. **Davis.**

An Excursion in Bosnia, Hercegovina, and Dalmatia. By W. M. Davis. *With Illustrations.*

The excursion was made with Prof. Penck and a party of geographical students in 1899.

Austria—Karst. *M.G. Ges. Wien* 43 (1900): 381-390. **Trampler.**

Drei Dolinengruppen im mährischen Karst. Von R. Trampler. *With Plans.*

Austria—Rainfall, etc.

Hydrographischer Dienst in Österreich. Jahrbuch des k. k. hydrographischen Central-Bureaus. VI. Jahrgang, 1898. Wien, 1900. Size 14½ × 11. *Maps and Diagrams. Presented by the k. k. hydrographische Central-Bureau, Vienna.*

This valuable publication gives the full results of rainfall, water-level, and

temperature observations for the various river-systems of Austria. Its scope is slightly extended as compared with the previous volume.

Balkan Peninsula. *Norske G. Selsk. Aarb.* **11** (1899–1900): 17–33. **Broch.**

Paa høifjeldet mellem Serbien og Bulgarien af professor Olaf Broch. *With Illustrations.*

On the highlands between Servia and Bulgaria.

Balkan Peninsula. *M.G. Ges. Wien* **43** (1900): 391–396. **Levačić.**

Ueber die Umschreibung des griechischen θ, δ und χ in den geographischen Namen der Balkanhalbinsel. Von K. u. K. Hauptmann Johann Levačić.

The writer defends his system of transliteration against the criticisms of Prof. Penck.

Balkan Peninsula—Language. *Ric. G. Italiana* **8** (1901): 42–48. **Baldacci.**

La lingua italiana in relazione al nostro commercio nell' Albania e nell' Epiro. Di A. Baldacci.

Urges the importance for Italian trade of the diffusion of the Italian language in the Balkan peninsula.

Balkans. *Jahresb. G. Ges. München* (1898–99): lxxii–lxxiii. **Goetz.**

Ueber seine Wanderung im Centralbalkan. Von Prof. Dr. W. Goetz.

Belgium and France. *Globus* **79** (1901): 94–97. **Bischoff.**

Die germanisch-romanische Sprachgrenze in Belgien und Nordfrankreich. Von Prof. H. Bischoff.

Belgium—Ghent. **Hallett.**

Trade of Ghent for the year 1899. Foreign Office, Annual No. 2540, 1900. Size 10 × 6½, pp. 10. *Price* 1*d.*

Europe—Anthropology. **Pasanisi.**

B.S.G. Italiana **1** (1900): 813–836, 929–956, 1026–1066.

Le Razze d'Europa. Nota del dott. Fr. M. Pasanisi.

Europe—History. **Helmolt.**

Weltgeschichte. Herausgegeben von Hans F. Helmolt. Siebenter Band. Westeuropa, Erster Teil. Von Prof. Dr. Richard Mayr, Dr. Armin Tille, Prof. D. Wilhelm Walther, Prof. Dr. Georg Adler und Prof. Dr. Hans von Zwiedineck-Südenhorst. Leipzig and Wien: Bibliographisches Institut, 1900. Size 10½ × 7, pp. xii. and 574. *Maps and Illustrations.*

This is the third volume so far issued of the general history of mankind, of which the first was noticed in vol. xv. of the *Journal* (p. 446), and which is intended to present a picture of the general progress of the human race. The present volume, which, like the former ones, is illustrated by maps, deals in the first section with the commerce and general economic conditions of Western Europe since the crusades.

France. *Ann. G.* **10** (1901): 17–26. **Bleicher.**

La vallée de l'Ingressin et ses débouchés dans la vallée de la Meuse. Par Prof. G. Bleicher.

The writer combats the idea adopted among others by Prof. W. M. Davis, that the upper Moselle once flowed into the Meuse near Toul. See note, *ante*, p. 524.

France—Bourg-sur-Gironde. *B.S.G. Com. Bordeaux* **23** (1900): 454–459. **Imbert.**

Excursion à Bourg-sur-Gironde. Par M. Louis Imbert.

France—Brittany. *Questions Dipl. et Colon.* **11** (1901): 1–16. **Layec.**

La Bretagne et la colonisation française. Par M. A. Layec.

France—Coalfields. *Naturw. Wochenschrift* **16** (1901): 16–18. **Söhle.**

Bericht über der im Anschluss an den VIII. internationalen Geologen-Congress zu Paris nach den Kohlenrevieren von Commentry und Decazeville stattgehabten Excursionen. Von Dr. Söhle.

France—Gascony. *B.S.G. Com. Bordeaux* **27** (1901): 25–34, 45–55. **Saint-Jours.**

État ancien du littoral gascon. Par le Captaine Saint-Jours. *With Maps.*

France—Geology. *C. Rd.* **132** (1901): 184–187. **Glangeaud.**

Les dômes de Saint-Cyprien (Dordogne), Sauveterre et Fumel (Lot-et-Garonne). Note de M. Ph. Glangeaud.

France—Geology. *Geolog. Mag.* **8** (1901): 59–65. **Johnston.**

Some Geological Notes on Central France. By Miss M. S. Johnston. *With Plates.*

France—Gironde. *B.S.G. Com. Bordeaux* **26** (1900): 194–201. **Courty.**
Climatologie bordelaise de l'année 1899. Par F. Courty.

France—Hautes-Pyrénées. *C. Rd.* **131** (1900): 1255–1258. **Bresson.**
Sur l'âge des massifs granitiques de Cauterets et du Néouvielle (Hautes-Pyrénées) et d'une partie des formations anciennes qui les bordent. Note de M. A. Bresson.

France—Hérault. ———
Géographie générale du Département de l'Hérault publiée par la Société Languedocienne de Géographie. Tome Troisième. Histoire générale. 1er Fasc. L'Hérault aux temps préhistoriques. Montpellier, 1900. Size 10 × 6½, pp. 198. *Map and Illustrations. Price 3 fr. Presented by the Société Languedocienne de Géographie.*
Continuation of the work begun in 1891 (cf. *ante*, p. 84).

France—Lille. *A travers le Monde, Tour du Monde* **7** (1901): 33–35. **Houbron.**
La foire de la Braderie à Lille. Par M. G. Houbron. *With Illustrations.*
On a section of the annual fair held at Lille early in September.

France—Marseilles. *B.S.G. Marseille* **24** (1900): 259–263. **Turquan.**
Marseille seconde ville de France. Par M. Victor Turquan.
Forecasting the probable results of the approaching census of France, the writer thinks that Marseilles will have regained the distinction of being the second city in France, held of late years by Lyons.

France—Meurthe et Moselle. *B.S.G. de l'Est* **21** (1900): 181–204. **Bleicher.**
Le plateau central de Haye. Étude de géographie physique régionale. Par M. Bleicher. *With Map and Plates.*
A study of the physical features of the district west of Nancy, between the Meurthe and the Moselle.

France—Saône. *Ann. G.* **10** (1901): 27–45. **Barré.**
La haute vallée de la Saône. Par Prof. O. Barré. *With Maps.*

France—Saône. *Ann. G.* **10** (1901): 46–67. **Tavernier.**
Étude hydrologique sur le bassin de la Saône. Par H. Tavernier. *With Maps and Diagrams.*

France—Silk-Production. *B.S.G. Lyon* **17** (1901): 36–43. **Groffier.**
La Production de la Soie en France. Par M. V. Groffier.

France—Var. *B.S.G. Marseille* **24** (1900): 264–281. **Delmas.**
La vallée de la Bresque (Var). Par M. Jacques Delmas.

Germany—Baltic Coast. *Q.J. Geol. S.* **57** (1901): 1–19. **Bonney and Hill.**
Additional Notes on the Drifts of the Baltic Coast of Germany. By Prof. T. G. Bonney and the Rev. E. Hill. *With Sections.*

Germany—Bavaria. *Jahresb. G. Ges. München* (1898–99): 37–82. **Erk.**
Die Klimatologische Landesforschung in Bayern. Von Fritz Erk. *With Diagrams.*

Germany—Bavaria. *Jahresb. G. Ges. München* (1898–99): 83–93. **Oberhummer.**
Nachträgliches zur Aventin-Karte. Von Eugen Oberhummer. *With Plate.*
Additional observations respecting Aventin's map of Bavaria (1823), published by the Munich Geographical Society in 1899.

Germany—Coalfields. *Naturw. Wochenschrift* **16** (1901): 1–6. **Holzapfel.**
Zusammenhang und Ausdehnung der deutschen Kohlenfelder. Von E. Holzapfel.

Germany—Hessen. *Sitzb. A. W. Berlin* (1900): 1023–1039. **Bauer.**
Beiträge zur Kenntniss der niederhessischen Basalte. Von Prof. Dr. M. Bauer.

Germany—Hessen. *G.M. Hessen*, Parts i. and ii. (1900): 5–102. **Krausmüller.**
Die Volksdichte der Grossherzogl. Hessischen Provinz Oberhessen auf Grund der Volkszählung vom 2. Dezember, 1895. Von Dr. Georg Krausmüller.

Germany—Northern Plain. *Zemlevedenie* **7** (1900): 1–28. **Adler.**
The North-German Lowland. By B. F. Adler. [In Russian.] *With Maps and Illustrations.*

Germany—Northern Plain. *Verh. Ges. Erdk. Berlin* **28** (1901): 116–124. **Wahnschaffe.**
Herr Professor Dr. F. Wahnschaffe: Die Ursachen der Oberflächengestaltung des norddeutschen Flachlandes.

Germany—Pomerania. *J.R. United Service I.* **45** (1901): 144–161. **Gunter.**
The German Imperial Manœuvres in Pomerania. Compiled by Lieut.-Colonel E. Gunter. *With Maps.*

Germany—Prussia. **Hellmann.**
Regenkarte der Provinzen Westpreussen und Posen. Mit erläuterndem Text und Tabellen. In amtlichem Auftrage bearbeitet von Prof. Dr. G. Hellmann. Berlin: D. Reimer (Ernst Vohsen), 1900. Size 10½ × 7, pp. 28. *Map. Presented by the K. Preuss. Meteorologischen Institut, Berlin.*

Germans and Italians. **Cipolla.**
Rendiconti R.A. Lincei **9** (1900): 369–422, 517–563, 567–603.
Della supposta fusione degli Italiani coi Germani nei primi secoli del medioevo. Del Carlo Cipolla.

Glacial Erosion. *P. Boston S. Nat. Hist.* **29** (1900): 273–322. **Davis.**
Glacial Erosion in France, Switzerland, and Norway. By W. M. Davis. *With Plates.*

Greece—Seriphos. *B.S.R. Belge G.* **24** (1900): 533–558. **Hauttecœur.**
L'île de Sériphos. Par M. H. Hauttecœur. *With Map.*

Holland—Lauwerzee. **Kuyper.**
Tijds. K. Ned. Aard. Genoots. Amsterdam **18** (1901): 1–6.
Indijking der Lauwer(s)zee. Door J. Kuyper. *With Map.*
On the proposed reclamation of the Lauwerzee, the large opening on the coast between the Ems and the Zuider Zee.

Holland—Zeeland. *Globus* **79** (1901): 72–75. **Hansen.**
Das Wasserwesen der niederländischen Provinz Zeeland. Von R. Hansen. *With Map and Illustrations.*

Hungary—Carpathians. *C. Rd.* **132** (1901): 360–363. **Martonne.**
Nouvelles observations sur la période glaciaire dans les Karpates méridionales. Note de M. E. de Martonne.

Hungary—Carpathians. *Deutsche Rundschau G.* **23** (1901): 169–172. **Reiner.**
Die Babia Góra. Von Dr. Julius Reiner.

Italy. **Davis.**
Fault Scarp in the Lepini Mountains, Italy. By W. M. Davis. (B. Geolog. S. America, vol. ii. pp. 207–216. *Plates.*) Rochester, April, 1900.

Italy—Health. *Climate* **2** (1901): 61–67. ——
The Malaria Experiments in the Campagna. *With Illustrations.*

Italy—Tiber. *B.S.G. Italiana* **2** (1901): 246–251. **Perrone.**
La piena del Tevere del dicembre 1900. Nota del sig. Eugenio Perrone.
The Tiber flood of December 2 last was one of the highest ever known.

Italy—Tuscany. **Carmichael.**
In Tuscany. Tuscan Towns, Tuscan Types, and the Tuscan Tongue. By Montgomery Carmichael. London: John Murray, 1901. Size 8½ × 5½, pp. xviii. and 356. *Map and Illustrations. Price* 9*s. net. Presented by the Publisher.*
An attractively written book, in which the writer endeavours to present to the reader a truthful impression of Tuscany and the Tuscans in general. The cities and districts described are, in the main, those not touched by the majority of tourists, nothing being said, *e.g.*, of Florence and Siena.

Italy and Scandinavia. *J. Anthrop. I.* **30** (1900): 89–94. **Montelius.**
On the Earliest Communications between Italy and Scandinavia. By Prof. Oscar Montelius. *With Plates.*

Lapland. *Rev. G.* **48** (1901): 104–113. **Vinci.**
Le renne et le Lapon. Par V. Gaudard de Vinci.
On the threatened extinction of the reindeer in Europe, and with it of the Lapp race.

Mediterranean—Crete. *Contemporary Rev.* **78** (1900): 794–808. **Hogarth.**
The exploration of Crete. By D. G. Hogarth.
On recent archæological explorations, to which the writer, in association with Mr. Evans, contributed his share in the spring of 1899.

Mediterranean—Cyprus. **Cobham.**

An attempt at a Bibliography of Cyprus. By C. D. Cobham. Fourth Edition. Nikosia, 1900. Size 8 × 5½, pp. 56. *Presented by the Compiler.*

Mont Blanc—Railway. *A travers le Monde, Tour du Monde* **7** (1901): 5. ———

Le Chemin de fer du Mont Blanc. *With Map.*

Norway—Hamar. *Norske G. Selsk. Aarb.* **11** (1899–1900): 66–96. **Kiær.**

Nordre Østerdalen (En historisk-statistisk studie over befolkningsforhold og næringsliv i Nordre Østerdalens fogderi). Af A. T. Kiær. *With Map.*

On the movement of population and conditions of life on the Upper Glommen, Hamar Province.

Pyrenees. **Labroue.**

E. Labroue. A travers les Pyrénées. Paris: C. Tallandier [not dated]. Size 11½ × 8, pp. viii. and 256. *Illustrations. Price* 6 *fr.*

A good general account of the range of the Pyrenees, illustrated from photographs.

Rumania. **Benger.**

Rumania in 1900. By G. Benger. Authorized Translation by A. H. Keane. London: Asher & Co., 1900. Size 11½ × 7½, pp. xiv. and 286. *Maps, Portraits, and Illustrations. Price* 10*s. net. Presented by the Publishers.*

A useful account of the geography, resources (mineral and agricultural), trade and industry of Rumania. The book is well illustrated, but its general appearance suffers from the use of one of the modern, highly glazed papers, which, as far as the text is concerned, is to be deprecated from every point of view.

Rumania—Agriculture. *B. Statistic Rominiei* 5 (1900): 81–107. ———

Statistica agricolă din Anul 1900.

Rumania—Population. *B. Statistic Rominiei* **5** (1900): 108–112. ———

Mișcarea Populațiunei Românîei in Anul 1899.

On the movement of population in Rumania in 1899.

Rumania—Population. ———

Miscarea Populatiunei Românieĭ in 1895. Precedată de o introductiune cu date retrospective de Leonida Colescu. Bukharest, 1900. Size 12½ × 9, pp. 6, xlii. and 56.

Rumania—Trade. *B.S.G. Marseille* **24** (1900): 249–258. **Levy.**

Le Commerce extérieur de la Roumanie. Par M. Victor Levy. *With Diagram.*

Rumania—Trade. *B. Statistic Românîei* **5** (1900): 113–125. ———

Commerce extérieur de la Roumanie dans les Années 1890–1899.

Russia. *Zemlevedenie* **7** (1900): 105–108. **Lutzenko.**

Observations on the lakes at the source of the Don. By E. I. Lutzenko. [In Russian.]

Russia. *Zemlevedenie* **7** (1900): 95–104. **Tanfilev.**

On the structure of the Lower Moscow peat-moor. By G. I. Tanfilev. [In Russian.]

Russia. *Die Natur* **50** (1901): 63–65. **Rossmässler.**

Steppe und Hochgebirge in Russland. Von F. A. Rossmässler.

Russia—Amber. *Deutsche Rundschau G.* **23** (1901): 163–165. **Zweck.**

Die Bernsteingruben nördlich von Polangen. Von Dr. Alb. Zweck.

On recently discovered deposits of amber in the Baltic provinces.

Russia—Finland. *Bidrag Finlands Natur och Folk* **59** (1900): 123–171. **Sundell.**

Åskvädren i Finland 1894. Af A. F. Sundell. *With Diagram.*

On the seasonal distribution of thunderstorms in Sweden in 1894.

Russia—Finland. **Van der Vlugt.**

Pour la Finlande. Par W. Van der Vlugt. Paris, 1900. Size 7½ × 5½, pp. 132.

Account of the recent mission of six delegates—including Baron von Nordenskiöld—to St. Petersburg to present an address to the Czar on behalf of the Finnish people, and their subsequent visit to Finland.

Russia—Novorossisk. *Ann. Hydrographie* **28** (1900): 567–570. **Herrmann.**

Noworossisk, bearbeitet durch J. Herrmann. *With Plan.*

Russian Empire.

The Russian Empire and the Trans-Siberian Railway. [From the *Summary of Commerce and Finance* for April, 1899.] Treasury Department, Bureau of Statistics. Size 12 × 9½, pp. 2503-2600. *Map.*

Switzerland—Geology. *Eclogæ Geol. Helvetiæ* **6** (1900): 497–500. **Lugeon.**

Première communication préliminaire sur la géologie de la région comprise entre le Sanetsch et la Kander (Valais-Berne). Par Maurice Lugeon.

Switzerland—Mountain Structure. *C. Rd.* **132** (1901): 45–47. **Lugeon.**

Sur la découverte d'une racine des Préalpes suisses. Note de M. Maurice Lugeon.

United Kingdom—Anglesey. *Q.J. Geol. Soc.* **57** (1901): 20–30. **Matley.**

The Geology of Mynydd-y-Garn (Anglesey). By C. A. Matley. *With Map and Section.*

United Kingdom—Channel Islands. *Nineteenth Century* **48** (1900): 881–890. **Clowes.**

The Strategical Value of the Channel Islands. By W. L. Clowes.

United Kingdom—Coal. *J. of T. Victoria I.* **32** (1900): 10–20. **Hull.**

Our Coal Reserves at the Close of the Nineteenth Century. Being the Annual Address of the Victoria Institute for 1900. By Prof. Edward Hull, LL.D., etc.

The author favours an export duty on coal as a means of husbanding the British supply.

United Kingdom—Population. *J.R. Statistical S.* **63** (1900): 527–595. **Welton.**

On the distribution of Population in England and Wales, and its Progress in the period of Ninety Years from 1801 to 1891. By Thomas A. Welton.

United Kingdom—Roman Defences. *P.R.I.* **16** (1900): 35–44. **Horsley.**

The Roman Defences of South-East Britain. By Victor Horsley.

United Kingdom—St. Kilda. **Heathcote.**

St. Kilda. By Norman Heathcote. London: Longmans & Co., 1900. Size 9 × 6, pp. xiv. and 230. *Map and Illustrations. Price* 10*s.* 6*d. net. Presented by the Author.*

A pleasantly written account of St. Kilda, its people, history, and prospects, with a special chapter on its bird-life, by the author of the paper published in the *Journal* for February, 1900.

United Kingdom—Wales. *Geolog. Mag.* **8** (1901): 68–69. **Greenly.**

Recent Denudation in Nant Ffrancon, North Wales. By Edward Greenly.

On the landslip of August, 1900.

United Kingdom—Yorkshire. *Geolog. Mag.* **8** (1901): 17–20. **Stather.**

The Sources and Distribution of the Far-travelled Boulders of East Yorkshire. By J. W. Stather.

ASIA.

Arabia—Muscat. *Tour du Monde* **7** (1901): 73–96. **Allemann.**

Mascate. Par Émile Allemann. *With Illustrations.*

Asia—Discovery. *Riv. G. Italiana* **7** (1900): 583–598. **Porena.**

Le scoperte geografiche del secolo XIX. del Prof. Filippo Porena. IV. Scoperte nell' Asia.

Asia—European Influence. *Contemporary Rev.* **79** (1901): 169–180. **Townsend.**

The Influence of Europe on Asia. By Meredith Townsend.

Asia—Railways. *Rev. G.* **48** (1901): 42–50, 131-137. **Barré.**

Les chemins de fer asiatiques. Par M. Paul Barré.

Central Asia. **Futterer.**

Durch Asien, Erfahrungen, Forschungen und Sammlungen während der von Amtmann Dr. Holderer unternommenen Reise. Mit Unterstützung des Grossherzoglich Badischen Ministeriums der Justiz des Kultus und Unterrichts, und des Naturwissenschaftlichen Vereins in Karlsruhe herausgegeben von Dr. K. Futterer. Band I. Geographische Charakter-Bilder. Berlin: Dietrich Reimer (Ernst Vohsen), 1901. Size 11 × 8, pp. xxvi. and 546. *Map and Illustrations. Presented by the Publisher.*

This important work will be specially noticed.

Central Asia—Sea of Aral. *Zemlevedenie* **7** (1900): 78–94. **Beri.**
Journey to the Sea of Aral. By L. C. Beri. [In Russian.]

Ceylon—Historical. *J. Ceylon Br. R. Asiatic S.* **16** (1899): 15–28. ———
Antiquarian Discovery relating to the Portuguese in Ceylon. *With Illustration.*
On the discovery at Colombo of a Portuguese coat-of-arms with apparent date 1501.

Ceylon—Historical. *J. Ceylon Br. R. Asiatic S.* **16** (1899): 36–78. **Bualtjens.**
Governor Van Eck's Expedition against the King of Kandy, 1765. Translated from the Dutch by A. E. Bualtjens. *With Map.*

Ceylon—Survey. **Grinlinton.**
Ceylon. Administration Reports, 1899. Part ii. Scientific. Survey Department. Report of Mr. F. H. Grinlinton, Surveyor-General. Size 13½ × 8½, pp. 30. *Maps and Illustrations. Presented by the Surveyor-General of Ceylon.*

China. **Madrolle.**
Itinéraires dans l'ouest de la Chine 1895. Par Cl. Madrolle. Pour accompagner le Journal de l'auteur dans son Voyage au Iun-nan, au Tibet chinois et au Se-tch'ouen. Paris: A. Challamel, 1900. Size 10½ × 7½. *Maps. Presented by the Author.*

A reproduction in eighteen sheets of the route-surveys of M. Madrolle on his journey in Western China.

China. **Spence.**
China. Shanghai to the Great Wall. Colonel J. Spence, D.A.G. Wednesday, July 5, 1900. (Malta Naval and Military Society.) Size 9 × 7, pp. 16.
Describes a journey carried out in 1863.

China. **Wolf.**
Eugen Wolf. Meine Wanderungen. I. Im innern Chinas. Stuttgart und Leipzig: Deutsche Verlags-Anstalt, 1901. Size 9½ × 6½, pp. 298. *Map and Illustrations. Price 5 m.*

This is an account of a journey through Northern and Central China, for the study of commercial and industrial conditions, and contains much useful information.

China—Commerce. ———
Commercial China in 1899. Area, Population, Production, Railways, Telegraphs, Transportation Routes, Foreign Commerce, and Commerce of the United States with China. [From the Summary of Commerce and Finance for December, 1899.] Treasury Department, Bureau of Statistics. Size 12 × 9½, pp. 1581–1762. *Map. Presented by the Philadelphia Commercial Museums.*

China—Hankow-Canton Railway. *Mouvement G.* **17** (1900): 631–636. **Wauters.**
Le chemin de fer Hankow-Canton. Par A. J. Wauters. *With Maps.*

China—Railways. *Questions Dipl. et Colon.* **11** (1901): 193–204. **Zimmermann.**
La pénétration de la Chine méridionale. Par M. Maurice Zimmermann. *With Map.*
On proposed railway routes to South-West China.

China—Singan. *National G. Mag.* **12**: (1901): 63–66. **Hubbard.**
Singan: the present Capital of the Chinese Empire. By J. M. Hubbard.

China—Trade. *J.R. Colonial I.* **32** (1901): 216–247. **Whitehead.**
The Expansion of Trade with China. By T. H. Whitehead.

China—Yunnan. *Tour du Monde* **7** (1901): 1–72. **Vaulserre.**
A travers le Yun-Nan et du Yun-Nan au Tonkin, par le Kouei-tchéou et le Kouang-si. Par M. le Vicomte de Vaulserre. *With Maps and Illustrations.*
Narrative of a journey in Yunnan and Tongking in 1898, in connection with railway surveys.

China—Yunnan. *Rev. Maritime* **147** (1900): 241–272, 449–490. ———
Le Yunnan.
A comprehensive account of Yunnan and its recent history.

Chinese Empire—Manchuria. *Petermanns M.* **47** (1901): 43–47. **Bretschneider.**
Das russische Pachtgebiet in der südlichen Mandschurei. Von Dr. E. Bretschneider.

Chinese Empire—Tibet. *Z. Ges. Erdk. Berlin* **35** (1900): 297–341. **Futterer.**
Land und Leute in Nordost-Tibet. Von Prof. Dr. K. Futterer.

Chinese Empire—Tibet. *Rev. G. Italiana* **7** (1900): 565–582. **Puini.**

Viaggio nel Tibet del P. Ippolito Desideri del Prof. Carlo Puini.

Notes on Desideri's journey, with abstracts from the geographical part of his manuscript.

Dutch East Indies. **Van der Chijs.**

Dagh-Register gehouden int Casteel Batavia vant passerende däer ter plaetse als over geheel Nederlandts-India, Anno 1672. Uitgegeven door het Bataviaasch Genootschap van Kunsten en Wetenschappen . . . van Mr. J. A. Van der Chijs. Batavia and the Hague: M. Nijhoff, 1899. Size 11 × 7½, pp. 390.

Eastern Asia. **Leroy-Beaulieu.**

The Awakening of the East. Siberia, Japan, China. By Pierre Leroy-Beaulieu. Translated by Richard Davey. With a Preface by Henry Norman. London: W. Heinemann, 1900. Size 8 × 5½, pp. xxviii. and 300. *Price* 6*s*.

This is a thoughtful study of questions relating to Eastern and Northern Asia, with a large amount of, at the time of writing, up-to-date information.

Eastern Asia—Cyclones. *Ann. Hydrographiques* (1900): 47–161. **Algué.**

Les cyclones aux Philippines et dans les mers de Chine. Étude théorique et pratique. Par le P. José Algué. *With Diagrams.*

French Indo-China. **Picanon.**

Eugène Picanon. Le Laos Français. Paris: A. Challamel, 1901. Size 7½ × 5, pp. viii. and 364. *Map. Price* 3*s*.

A good general account of the geography, history, productions, etc., of the French sphere in the Mekong basin. The map shows the political divisions.

Himalayas—Mount Everest. *Petermanns M.* **47** (1901): 40–43. **Schlagintweit.**

Der Name des höchsten Berges der Erde. Von Dr. Emil Schlagintweit.

The writer deprecates the use of a Tibetan name owing to the difficulty both of writing and pronunciation, but advocates the retention of the Indian name Gaurisankar, coupled with that of Everest.

India. *J.S. Arts* **49** (1901): 290–305. **Bell.**

Railways and Famine. By H. Bell.

The writer suggests that, by serving to deplete in good seasons the margin of food supply which might be available in bad seasons, the Indian railways may be a not unmixed good.

India—Afghan Frontier. **Foucher.**

A. Foucher. Sur la frontière Indo-Afghane. Paris: Hachette & Cie., 1901. Size 7½ × 5, pp. viii. and 258. *Map and Illustrations. Presented by the Publishers.*

Account of a journey carried out in 1895–97 on the north-west frontier of India, on behalf of the French Ministry of Public Instruction, mainly for archæological research.

India—Anjediva Island. *B.S.G. Lisboa* **17** (1898–1899): 381–388. ———

Memoria historica do actual estado da ilha e praça de Angediva.

India—Burma Gazetteer. **Scott and Hardiman.**

Gazetteer of Upper Burma and the Shan States. In Five Volumes. Compiled by J. George Scott, assisted by J. P. Hardiman. Part i. vols. i. and ii. Rangoon, 1900. Size 10½ × 7, pp. (part i. vol. i.) 728 and x.; (part i. vol. ii.) 560, viii., and xii. *Map, Plan, and Illustrations. Presented by R. F. Scott, Esq.*

The first two volumes of what promises to be a valuable summary of our knowledge of Upper Burma and the districts inhabited by wild tribes to the north and east. They consist of a series of chapters dealing with a variety of subjects, from the history of the reigns of the last kings of Burma from native sources, to the geology and economic mineralogy, forestry, and agriculture of the country. The sections dealing with ethnology are particularly full and interesting, and are illustrated by photographs showing various native types.

India—Distribution of Animals. *P.R.S.* **67** (1901): 484–492. **Blanford.**

The Distribution of Vertebrate Animals in India, Ceylon, and Burma. By W. T. Blanford, F.R.S. (Abstract.) [See also *Nature* **63** (1901): 287–289.]

Abridgment of a paper read at the Royal Society in December last.

India—Famines. **Nevins.**

P. Lit. and Philosoph. S. Liverpool, No. 54 (1900): 145–159.

On Indian Famines. By J. Ernest Nevins.

India—Himalayas. *Alpine J.* **20** (1901): 305–313. **Bruce.**

Mountaineering in the Himalayas. By Major the Hon. C. G. Bruce. *With Illustrations.*

India—Kashmir. **Adair.**

The Big Game of Baltistan and Ladakh. A Summer in High Asia, being a record of Sport and Travel in Baltistan and Ladakh. By Captain F. E. T. Adair. With an Appendix on Central Asian Trade by Captain S. H. Godfrey (Late British Joint Commissioner at Leh). London: W. Thacker & Co., 1899. Size 9½ × 6, pp. xii. and 286. *Map and Illustrations. Price* 12*s.* 6*d.*

Although the journeys here described were undertaken for purposes of sport, the book supplies some additions to our knowledge of the remote frontier districts north of Kashmir. The appendix also contains useful information.

India—Kashmir. *Scottish G. Mag.* **17** (1901): 74–86. **Workman.**

Amid the Snows of Baltistan. By Fanny Bullock Workman. *With Illustrations.*

India—Mining. *J.S. Arts* **49** (1901): 153–177. **Evans.**

Metalliferous Mining in India. By John W. Evans, D.SC.

The author devotes his attention particularly to Continental India, and omits consideration of the iron ores.

India—Nicobar Islands. *Indian Antiquary* **29** (1900): 341–347. **Temple.**

An Unpublished Document about the Nicobars. By R. C. Temple.

The document is a manuscript by Captain John Ritchie, who surveyed the Andamans and Nicobars about 1770, and made observations of much interest.

India—North-West Frontier. **Holdich.**

The Indian Borderland, 1880–1900. By Colonel Sir T. Hungerford Holdich. London: Methuen & Co., 1901. Size 9 × 6, pp. xii. and 402. *Map and Illustrations. Price* 15*s. net. Presented by the Publishers.*

This will be the subject of a special review.

India—Sugar Canes. *J.S. Arts* **49** (1901): 147–148. **Gill.**

Indian Sugar Canes. By Francis N. G. Gill.

India—Water-supply. *J.E. India Assoc.* **33** (1901): 9–19. **Sowerby.**

Water-supply in Mitigation of Drought in India. By William Sowerby.

India, Burma, and Ceylon. **Murray.**

A Handbook for Travellers in India, Burma, and Ceylon, including the Provinces of Bengal, Bombay, and Madras, the Punjab, North-West Provinces, Rajputana, Central Provinces, Mysore, etc., the Native States, Assam, and Cashmere. Fourth Edition. London: John Murray, 1901. Size 7 × 5, pp. xc. and 484. *Maps and Plans. Price* 20*s. Presented by the Publisher.*

Virtually a reprint of the revised and enlarged third edition issued in 1898, statistics being, however, brought up to date.

Indian Ocean—Rainfall. *P.R.S.* **67** (1901): 409–431. **Lockyer.**

On Solar Changes of Temperature and Variations in Rainfall in the Region Surrounding the Indian Ocean. By Sir Norman Lockyer, K.C.B., F.R.S., and W. J. S. Lockyer, PH.D. *With Diagrams.*

Indo-China. *B.S.G. Lille* **35** (1901): 35–44. **Gallois.**

Voies de communications maritimes et fluviales en Indo-Chine. Par M. Eugène Gallois.

Japan—Commerce. ———

Commercial Japan in 1899. Area, Population, Production, Railways, Telegraphs, Transportation Routes, Foreign Commerce, and Commerce of the United States with Japan. [From the *Summary of Commerce and Finance* for July, 1899.] Treasury Department, Bureau of Statistics. Size 12 × 9¼, pp. 23–158. *Map. Presented by the Philadelphia Commercial Museums.*

Japan—Nagasaki. **Longford.**

Trade of Nagasaki for the year 1899. Foreign Office, Annual No. 2541, 1900. Size 10 × 6½, pp. 44. *Diagram. Price* 4*d.*

Japan and China. *National G. Mag.* **12** (1901): 69–77. **Webster.**

Japan and China—some comparisons. By Commander H. Webster. *With Illustrations.*

Korea. *Mission Field* **46** (1901): 44–53. **Hillary.**

A Journey to the North of Corea. By the Rev. F. Hillary. *With Illustrations.*

The journey was made early in 1900.

Malay Archipelago—Borneo. **Engelhard.**

Bijd. Taal-, Land- en Volkenk. Ned.-Indië **8** (1901): 179–222.

De afdeeling Doessonlanden. (Zuider- en Ooster- afdeeling van Borneo.) Door H. E. D. Engelhard. *With Map.*

This division occupies the upper basin of the Barito.

Malay Archipelago—Java. **Kern.**

Bijd. Taal-, Land- en Volkenk. Ned.-Indië **8** (1901): 381–392.

Een Javaansch sprekende bevolking in de Preanger-Regentschappen. Door R. A. Kern.

Malay Archipelago—Java. **Van den Berg.**

Bijd. Taal-, Land- en Volkenk. Ned.-Indië **8** (1901): 1–140.

Het inlandsche Gemeentewezen op Java en Madoera. Door Prof. L. W. C. van den Berg.

On the village system of the native population of Java and Madura.

Malay Archipelago—Sumatra. *Globus*, **79** (1901): 1–7, 24–32. **Pleyte.**

Die Mentawei-Inseln und ihre Bewohner. Von C. M. Pleyte. *With Map and Illustrations.*

Persian Gulf. *Questions Dipl. et Colon.* **11** (1901): 129–146. **d'Avril.**

Le Golfe Persique, route de l'Inde et de la Chine. Par le Baron A. d'Avril. *With Map.*

Russia—Batum. *Ann. Hydrographie* **28** (1900): 571–574. **Herrmann.**

Batum, bearbeitet durch J. Herrmann.

Russia—Siberia. **Ditmar.**

Reisen und Aufenthalt in Kamtschatka in den Jahren 1851–1855. Von Karl von Ditmar. Zweiter Theil. Allgemeines über Kamtschatka. Erste Abtheilung. (Beiträge zur Kenntniss des Russischen Reiches und der Angrenzenden Länder Asiens, Dritte Folge. Herausgegeben von L. v. Schrenck und C. J. Maximowicz, beendet von F. Schmidt. Band viii.) St. Petersburg, 1900. Size 10 × 7, pp. viii. and 276.

General pictures of the country and people of Kamchatka, supplementing the account of the journey published in the same series in 1890. The delay in issuing the present instalment is due to the author's death in 1892.

Russia—Siberia. **Slionine.**

Okhotsko-Kamtchatsky Kraij: Estestvennoistoricheskoe Opisanie. [The Okhotsk-Kamchatkan Region: A Natural-Historical Description.] By Dr. H. V. Slionine. 2 vols. (Vol. ii. Appendices.) St. Petersburg, 1900. Size 10 × 7, pp. (vol. i.) x. and 690; (vol. ii.) 166. *Map and Illustrations. Presented by the Author.*

An important work by a member of the Bogdanovich expedition of 1895–98. Dr. Slionine was attached to the mission by the Russian Ministry of Finance for the purpose of studying the economic geography and ethnology of the region bordering the sea of Okhotsk, but he also paid attention to its general geography, of which he gives a detailed account in this work. The book is excellently illustrated, and has large-scale map.

Russian Central Asia. *B.S.G. Marseille* **24** (1900): 337–342. **Gourdet.**

Lettres de l'Asie Centrale. Par M. Paul Gourdet.

On recent events in the Vyernye district.

Turkey. **Sykes.**

Through Five Turkish Provinces. By Mark Sykes. London: Bickers & Son, 1900. Size 9½ × 6, pp. viii. and 150. *Map and Illustrations. Price 7s. 6d.*

The account of a journey through Asiatic Turkey in 1899.

Turkey—Asia Minor. *Globus* **78** (1900): 350–357. **Vincenz.**

Ein Ausflug zu den Teppichknüpfern in Kula. Von Friedrich v. Vincenz. *Illustr.*

An account of the Kula carpet factories.

Turkey—Bagdad. **Le Strange.**

Baghdad during the Abbasid Caliphate from contemporary Arabic and Persian Sources. By G. Le Strange. Oxford: the Clarendon Press, 1900. Size 9 × 6,

pp. xxxii. and 382. *Map and Plans. Price* 16*s. nett. Presented by the Clarendon Press.*

An exhaustive account of the city of Baghdad and its mediæval plan, as deduced from the description written by Ibn Serapion in about 900 A.D., of which the British Museum possesses a unique copy. The plans show various portions of the city at different periods.

AFRICA.

Abyssinia. *National G. Mag.* **12** (1901): 89–102. **Crosby.**

Abyssinia—the Country and People. By Oscar T. Crosby.

Describes a visit to Abyssinia in 1900.

Abyssinia. *J. Anthrop. I.* **30** (1900): 50–55. **Koettlitz.**

Notes on the Galla of Walega and the Bertat. By Reginald Koettlitz, M.D. *With Illustrations.*

Abyssinia. *Questions Dipl. et Colon.* **11** (1901): 205–212. **Michel.**

L'Éthiopie: les intérêts anglais et français. Par M. Charles Michel. *With Map.*

Abyssinia. **Wylde.**

Modern Abyssinia. By Augustus B. Wylde. London: Methuen & Co., 1901. Size 9 × 6, pp. 506. *Frontispiece and Map. Price* 15*s. net. Presented by the Publishers.*

This will be noticed with other books on Africa.

Abyssinia. *B. Comité l'Afrique Française* **11** (1901): 72–78. ———

La question d'Éthiopie.

On the question of the future of Abyssinia.

Abyssinia. **Vivian.**

Abyssinia. Through the Lion-Land to the Court of the Lion of Judah. By Herbert Vivian, M.A. London: C. Arthur Pearson, Ltd., 1901. Size 9 × 6, pp. xvi. and 342. *Maps and Illustrations. Price* 15*s. Presented by the Publisher.*

This will be noticed together with other African books.

Abyssinia and Sudan. **Michel.**

Mission de Bonchamps. Vers Fachoda à la rencontre de la Mission Marchand à travers l'Éthiopie. Par Charles Michel. Paris: Plon-Nourrit & Cie, 1901. Size 9 × 6, pp. 560. *Map and Illustrations. Price* 7*s.* 6*d.*

An important work which will be specially noticed.

Africa—Climatology. *Brit. Assoc. Rep.* (1900): 413–420. **Ravenstein.**

The Climatology of Africa.—Ninth Report of a Committee. (Drawn up by the Chairman, Mr. E. G. Ravenstein.)

African Civilization. *Ann. Rep. Smithsonian I.* (1898): 637–650. **Frobenius.**

The Origin of African Civilizations. By L. Frobenius. *With Maps.*

Translation of the article which appeared in the *Zeitschrift* of the Berlin Geographical Society in 1898.

British East Africa—Uganda. **Lugard.**

The Story of the Uganda Protectorate. By General F. D. Lugard. (The Story of the Empire Series.) London: H. Marshall & Son [not dated]. Size 7 × 4½, pp. 176. *Price* 1*s.* 6*d. Presented by the Publishers.*

An excellent summary of the history of Uganda and the establishment of British rule in the country, by one whose share in the work accomplished is second to none. The natives and their manners and customs are fully described. The author considers the great drawback to progress has hitherto been the lack of continuity of administration.

British West Africa. **Wallach.**

Wallach's West African Manual: with a Map. Compiled by Henry Wallach. Second Edition. Enlarged. London: F. C. Mathieson & Sons, 1900. Size 7½ × 3½, pp. xxxvi. and 72. *Price* 2*s.* 6*d. net.*

The bulk of this manual is taken up with statistics relating to mining companies on the Gold Coast.

Central Africa. *Mouvement G.* **18** (1901): 13–16. ———

Dans le sud du Katanga. *With Map.*

Based on Mr. Chesnaye's narrative (*ante*, p. 42). The map is filled in from the

work of other travellers, but does not take account of Mr. Codrington's map in the *Journal* for March, 1900.

Congo.

Société d'Études Coloniales. Manuel du Voyageur et du Résident au Congo rédigé sous la direction du Général Donny. 3 vols. and Supplement. Bruxelles, 1900–1901. Size 9½ × 6½, pp. (i.) 336; (ii.) 224; (iii.) 260 (Supplement.—L'Art Militaire au Congo, 1897), 168. *Map [in 4 sheets in separate Cover] and Illustrations. Presented by the Société d'Études Coloniales.*

A most useful handbook, supplying a large amount of practical information in a handy form. Although primarily intended for travellers and residents in the Congo State, it will be of use to all visitors to and settlers in tropical countries. The subjects dealt with are very various, including, in addition to those ordinarily treated of in hints to travellers (outfit, surveys, medicine and hygiene, photography, collections, etc.), such others as the construction of houses, cultivation, and stock-raising. The map is the fourth edition of Prof. Du Fief's map of the Congo State, and shows (with a few exceptions) the routes of all travellers down to June, 1900.

Egypt. **Fuller.**

Egypt and the Hinterland. By F. W. Fuller. London: Longmans & Co., 1901. Size 9 × 6, pp. xvi. and 334. *Map and Frontispiece. Price* 10*s.* 6*d. net. Presented by the Publishers.*

This will be noticed with other African books.

Egypt. *Globus* **79** (1901): 105–108.

Unter den Fellachen Gosens. Von R. T. K. *With Illustrations.*

Egypt. *Geolog. Mag.* **8** (1901): 23–28. **Beadnell.**

On some Recent Geological Discoveries in the Nile Valley and Libyan Desert. By Hugh J. L. Beadnell. *Also separate copy, presented by the Author.*

A note appears on this paper (*ante*, p. 527).

Egypt—Climate. *J. of T. Victoria I.* **32** (1900): 87–105. **Grant Bey.**

The Climate of Egypt in Geological, Prehistoric, and Ancient Historic Times. By Dr. Grant Bey.

Egypt—Libyan Desert. *B.S. Khédiv. G.* **5** S. (1900): 429–475. **Moritz.**

Excursion aux oasis du désert libyque. Par Dr. B. Moritz. *With Illustrations.*

On a visit to the oases of Kharjah and Dakhilah early in 1900.

Egypt—Libyan Desert. *B.S. Khédiv. G.* **5** S. (1900): 477–478. **Paoletti.**

Route de Ghirgheh à Khargheh. Par H. Paoletti. *With Map.*

Egypt—Nile Valley. *Petermanns M.* **47** (1901): 1–10. **Schweinfurth.**

Am westlichen Rande des Nilthals zwischen Farschût und Kom Ombo. Von Prof. Dr. G. Schweinfurth. *With Map.*

A valuable contribution to our knowledge of the physical features of a part of the Nile valley, especial attention being given to geology and botany.

Egypt—Suez Canal. **Girard.**

B.S.G. Com. Bordeaux **26** (1900): 278, 329, 361, 394, 409, 429; **27** (1901): 9.

Le Canal maritime de Suez. Par M. B. Girard.

French Congo. *Questions Dipl. et Colon.* **11** (1901): 213–219. **Bourdarie.**

Le Congo Français et la Colonisation. Par M. Paul Bourdarie.

The writer discusses the probable results of recent colonial undertakings.

French Congo. *La G., B.S.G. Paris* **3** (1901): 181–192. **Jobit.**

Mission Gendron au Congo français. Explorations de la brigade Jobit. Par E. Jobit. *With Map.*

French Congo. *La G., B.S.G. Paris* **3** (1901): 193–196. **Lœfler.**

Mission Gendron au Congo français. Note sur la région comprise entre le N'Gounié et l'Alima. Par Ch. Lœfler.

French Congo. *Mouvement G.* **18** (1901): 85–91. **Wauters.**

Le problème du Wam. Par A. J. Wauters. *With Maps.*

M. Wauters thinks that the Wam is to be identified with the Vulu-Vuli, a tributary of the Gribingi, and not with the Bahr Sara (cf. *ante*, p. 306).

French Congo. *B. Comité l'Afrique Française* **11** (1901): 44–46.

La question du Wame. *With Map.*

This was referred to in the *Journal* for March (*ante*, p. 305).

French Somaliland. **Heudebert.**

Lucien Heudebert. Au Pays des Somalis et des Comoriens. Paris: J. Maisonneuve, 1901. Size 9 × 6, pp. 282. *Illustrations. Price* 5*s.* 8*d.*

This work gives a detailed account of the French Somali Coast Protectorate, its people, resources, trade, etc., as the result of a visit to the country. The section dealing with the Comoro islands, though containing some useful information, is much more brief.

French West Africa. ———

Renseignements Colon., Comité l'Afrique Française, No. 2 (1901): 25–32.

Le pays Zaberma. *With Map.*

Geographical and historical notes on the country between the Niger and the Dallol Mauri.

French West Africa—Chad Districts. **Reibell.**

Renseignements Colon., Comité l'Afrique Française, No. 1 (1901): 15–23.

La campagne contre Rabah. Rapport du Commandant Reibell.

French West Africa—Ivory Coast. **Nebout.**

A travers le Monde **6** (1900): 393–396, 401–404, 409–412; **7** (1901): 17–20, 35–36.

Notes sur le Baoulé. Par M. A. Nebout. *With Illustrations.*

German East Africa. *M. Deutsch. Schutzgeb.* **13** (1900): 344–346. **Herrmann.**

Bericht über Land und Leute längs der deutsch-englischen Grenze zwischen Nyassa und Tanganyika. Von Hauptmann Herrmann.

German East Africa. *M. Deutsch. Schutzgeb.* **13** (1900): 265–343. **Kohlschütter.**

Bericht über die astronomischen und geodätischen Arbeiten der deutschen Grenzregulirungs-Kommission zwischen dem Nyassa- und Tanganyika-See. Von Dr. E. Kohlschütter. *With Map (in four sheets) and Diagram.*

See note, *ante*, p. 429.

German East Africa. *Globus* **79** (1901): 53–55, 76–78, 92–94. **Leue.**

Uha (Deutsch-Ostafrika). Von A. Leue.

German East Africa. *M. Deutsch. Schutzgeb.* **13** (1900): 346–347. ———

Begleitworte zu Karte 4: Aufnahmen des Hauptmanns v. Prittwitz und Gaffron in den Utshúngwe-Bergen (Uhéhe) 1897 und 1898. *Map.*

German South-West Africa—Railway. **Gerding.**

Deutsche Kolonialzeitung **17** (1900): 567–569, 586–589.

Die Bahn Swakopmund-Windhuk. Von Oberstleutnant Gerding.

Gold Coast—Kumassi. **Hodgson.**

The Siege of Kumassi. By Lady Hodgson. London: C. Arthur Pearson, Ltd., 1901. Size 9 × 6, pp. 366. *Map, Plan, and Illustrations. Price* 21*s. Presented by the Publisher.*

A brightly written account of the thrilling events connected with the Ashanti troubles of 1900, with a few notes on questions affecting the future of the Gold Coast.

Madagascar. *Globus* **79** (1901): 55–63. **Seidel.**

Neue Forschungen und Fortschritte auf Madagaskar. Von H. Seidel. *With Illustrations.*

Madagascar, etc. **Keller.**

Madagascar, Mauritius, and the other East-African Islands. By Prof. Dr. C. Keller. London: Sonnenschein & Co., 1901. Size 9½ × 6½, pp. xiv. and 242. *Maps and Illustrations. Price* 7*s.* 6*d.*

A translation of the German work belonging to the same series as Fricker's 'Antarctic Regions.' It forms the best summary of our knowledge of the East African islands down to 1898.

Natal—Mining Industry. **Gray.**

Report on the Mining Industry of Natal for the year 1899. By C. J. Gray. Pietermaritzburg, 1900. Size 13½ × 8½, pp. 70.

North-East Africa. *B.G.S. Philadelphia* **2** (1900): 115–138. **Smith.**

An Expedition between Lake Rudolf and the Nile. By Dr. A. Donaldson Smith. *With Map.*

Portuguese East Africa. *C. Rd.* **131** (1900): 1258–1260. **Choffat.**

Sur le Crétacique supérieur, à Moçambique. Note de M. Paul Choffat.

Portuguese East Africa. *Questions Dipl. et Colon.* **11** (1901): 83–103. **Hause.**

Etudes sur les Colonies portugaises.—III. Moçambique. Par le prof. Henri Hauser.

Sahara—Adrar. *A travers le Monde, Tour du Monde* **6** (1900): 389. **Blanchet.**

La Mission saharienne Blanchet. *With Portrait and Map.*

Sahara—Tuat. *A travers le Monde, Tour du Monde* **7** (1901): 37–39. ——

Le Touat et le chemin de fer d'Igli. *With Map.*

South Africa. *Scottish G. Mag.* **17** (1901): 57–74. **[Corstorphine.]**

A Former Ice Age in South Africa.

Based on the work of Messrs. Rogers and Schwartz (cf. *ante*, p. 211).

West Africa. **Schlechter.**

Westafrikanische Kautschuk-Expedition. (R. Schlechter.) 1899–1900. Berlin: Verlag des Kolonial-Wirtschaftlichen Komitees, 1900. Size 10 × 7, pp. viii. and 326. *Illustrations. Price* 12 *m. Presented by the Kolonial-Wirtschaftliches Komitee.*

This will be noticed with other books on Africa.

West African Coasts. *J. of T. Victoria I.* **32** (1900): 147–164. **Hull.**

The Sub-Oceanic River Valleys of the West African Continent and of the Mediterranean Basin. By Prof. Edward Hull, LL.D., etc. *With Map.*

It is difficult to understand the writer's statement that the depth of the Congo opposite Banana creek only reaches 9 fathoms, and that the head of the sub-oceanic valley begins 5 miles to the west; the fact being that the deep cañon, with soundings reaching 124 fathoms, extends at least 11 nautical miles above the creek.

NORTH AMERICA.

Alaska—Boundary Question. *Scottish G. Mag.* **17** (1901): 30–40, 86–96. **Begg.**

Review of the Alaska Boundary Question. By Alexander Begg.

America—Hurricane. *Globus* **79** (1901): 32–33. **Greim.**

Der westindische Hurrikan vom 1. bis 12. September 1900, von — Greim. *Map.*

Canada—Geological Survey—Index. **Dowling.**

Geological Survey of Canada. General Index to the Reports of Progress, 1863 to 1884. Compiled by D. B. Dowling. Ottawa, 1900. Size 10 × 6½, pp. 476. *Presented by the Geological Survey of Canada.*

A most useful index, giving references under subjects as well as authors.

Canada—Gulf of St. Lawrence. *Nature* **63** (1901): 311–313. ——

The Currents in the Gulf of St. Lawrence.

Draws attention to points emphasized by the recent investigations, referred to in the *Journal* for December (vol. xvi. p. 685).

Canada—Historical. **Bourinot.**

Canada under British Rule 1760–1900. By Sir John G. Bourinot. Cambridge: The University Press, 1900. Size 8 × 5½, pp. xii. and 346. *Maps. Price* 6*s. Presented by the Cambridge University Press.*

The appearance of this work is particularly welcome at a time when so much attention is directed to the great self-governing colonies of Great Britain. It supplies in a convenient form a review of "the political, economic, and social progress of the provinces of Canada under British rule," with chapters on the early French history, and the relations with the United States. In the latter the various past and present boundary questions are discussed and illustrated by maps. An appendix draws a comparison between the constitutions of the Dominion of Canada and the Commonwealth of Australia.

Canada—Huron Race. *T. Ottawa Lit. and Sci. S.*, No. 2 (1899–1900): 69–92. **Gérin.**

The Hurons of Lorette. By Léon Gérin. *With Map.*

On the social conditions, traditions, etc., of the Huron settlement at Lorette, near Quebec.

Canada—Islands. *T. Ottawa Lit. and Sci. S.*, No. 2 (1899–1900): 9–68. **Johnson.**

Canada's Northern Fringe. By George Johnson.

On the northern islands constituted the District of Franklin by an Order-in-Council of 1895.

Canada—Moose River Basin. **Parks.**

The Huronian of the Moose River Basin. By W. A. Parks. (University of Toronto Studies, Geological Series, No. 1.) The University Library: Published by the Librarian, 1900. Size 10½ × 7, pp. 36. *Sketch-map.*

Canada—Rocky Mountains. **Leprince-Ringuet.**

Ann. Club Alpin Français **26** (1899): 249–269.

A travers le Canada, seconde ascension du Sir Donald. Par M. Leprince-Ringuet. *With Illustrations.*

Mexico. *B. Observatorio Astronóm. Nac. Tacubaya* **2** (1900): 187–216. **Covarrubias.**

Determinación de la posición geográfica de México. Por F. Diaz Covarrubias.

Mexico—Climate. **Moreno y Anda and Gomez.**

El clima de la República Mexicana en el año de 1896. Por M. Moreno y Anda y Antonio Gomez. Año II. México, 1900. Size 7 × 5, pp. 180. *Map and Diagram.*

Mexico—Lower California. *B. American G.S.* **32** (1900): 397–429. **Eisen.**

Explorations in the Central Part of Baja California. By Gustav Eisen, PH.D. *With Map.*

Mexico—National Observatory. ——

B. Observatorio Astronóm. Nac. Tacubaya **2** (1900): 217–262.

Longitud del Observatorio Astronómico Nacional Mexicano por señales telegráficas cambiadas directamente entre St. Louis Missouri (E. U. de A.) y Tacubaya. *With Plate.*

Mexico—Tacubaya. **Moreno y Anda.**

B. Observatorio Astronóm. Nac. Tacubaya **2** (1900): 183–186.

La variación diurna de la declinación magnética en Tacubaya en relación con el periodo de las manchas solares. Por M. Moreno y Anda.

Mexico—Vera Cruz. **Chapman.**

Trade of Vera Cruz for the years 1898-99 and part of 1900. Foreign Office, Annual, No. 2539, 1900. Size 9½ × 6, pp. 26. *Price* 2*d.*

Contains some particulars on means of communication in Mexico. The improvement of that over the isthmus of Tehuantepec will, it is said, revolutionize the foreign trade of Mexico.

Rocky Mountains—Flora. *Science* **12** (1900): 870–873. **Rydberg.**

Plant Geography of North America. Composition of the Rocky Mountain Flora. By Dr. P. A. Rydberg.

United States. *B. American Bureau G.* **1** (1900): 365–381. **Phelps.**

The Heart of our North-western Empire. By William F. Phelps. *Illustrations.*

This paper traces the influence of natural conditions on the history of the region of which Duluth is the centre.

United States—Agriculture. *J.R. Statistical S.* **63** (1900): 648–657. **Hooker.**

Farm Prices of Wheat and Maize in America, 1870-99. By R. H. Hooker, M.A. *With Diagrams.*

The diagrams illustrate the gradual approximation of prices in this country to those on the farm in the United States.

United States—California. *Sierra Club B.* **3** (1900): 150–158. **Kellogg.**

King's River Cañon Trail Notes. By V. L. Kellogg.

On the routes to the cañon on the south fork of King's river.

United States—California. *National G. Mag.* **12** (1901): 108–114. **McAdie.**

The Sea Fogs of San Francisco. *With Illustrations.*

United States—California. *Sierra Club B.* **3** (1900): 119–126. **Muir.**

Lake Tahoe in Winter. By John Muir.

United States—Geodesy. **Schott.**

Treasury Department. U.S. Coast and Geodetic Survey. Geodesy. The Transcontinental Triangulation and the American Arc of the Parallel. By Assistant Chas. A. Schott. Special Publication. No. 4. Washington, 1900. Size 12 × 9½, pp. 872. *Maps, Diagrams, and Illustrations. Presented by the U.S. Coast and Geodetic Survey.*

This gives a complete statement of the methods and results of the operations of the American Transcontinental Triangulation. In the concluding section a preliminary combination of the various American arcs yet measured is put forward, the result

showing, firstly, a striking agreement between the several results; and, secondly, that the five arcs within the United States, when combined with the Peruvian arc or among themselves, all demand a representative spheroid of somewhat larger dimensions than that of Bessel.

United States—Iron and Steel Trade.

Internal Commerce. The Iron and Steel Trade of the United States. Its resources, development, and relations to the Home and the World Markets. [From the Summary of Commerce and Finance for August, 1900.] Treasury Department, Bureau of Statistics. Size 11½ × 9½, pp. 199–280. *Map and Diagrams.*

United States—Maryland. **Abbe.**

B. American Bureau G. 1 (1900): 151–157, 242–248, 342–355.

The Physiographic Features of Maryland. By Cleveland Abbe, Jr. *With Map and Illustration.*

United States—Massachusetts. **Crosby.**

Geology of the Boston Basin. By William O. Crosby. Vol. i. Part iii.—The Blue Hills Complex. (Occasional Papers of the Boston Society of Natural History. IV.) Boston, 1900. Size 9½ × 6½, pp. 289–694. *Maps and Plates. Presented by the Boston Society of Natural History.*

United States—Massachusetts. *Nature* **63** (1900): 192–193. [**Haddon.**]

A Pre-Columbian Scandinavian Colony in Massachusetts. By A. C. H. *With Illustrations.*

On observations by Mr. Gerard Fouke in the *American Anthropologist.*

United States—Meteorology.

Tables of Daily Precipitation at Special River and Rainfall Stations of the United States Weather Bureau for the years 1893, 1894, 1895. (U.S. Department of Agriculture, Weather Bureau.) Washington, 1900. Size 10 × 6½, pp. 256. *Presented by the U.S. Department of Agriculture, Weather Bureau.*

United States—Pennsylvania. **MacElwee.**

P.A. Nat. Sci. Philadelphia (1900): 482–484.

The Flora of the Edgehill Ridge near Willow Grove and its Ecology. By A. MacElwee.

United States—Pennsylvania. *P.A. Nat. Sci. Philadelphia* (1900): 160–338. **Rand.**

Notes on the Geology of South-eastern Pennsylvania. By T. D. Rand. *With Map and Illustrations.*

United States—Population. *Globus* **79** (1901): 78–80. **Zimmermann.**

Wie wird sich die Bevölkerung der Vereinigten Staaten von Nordamerika im 20 Jahrhundert und darüber hinaus vermehren? Von Dr. R. Zimmermann.

United States—Rocky Mountains. **Davis.**

P. American A. Arts and Sci. **35** (1900): 345–373.

The Freshwater Tertiary Formations of the Rocky Mountain Region. By W. M. Davis.

United States—Texas. *G.Z.* **7** (1901): 42–49. **Deckert.**

Galveston und seine Sturmflut. Von Dr. Emil Deckert. *With Map.*

CENTRAL AND SOUTH AMERICA.

Andes. *P.R.I.* **16** (1900): 189–192. **Conway.**

Climbs and Explorations in the Andes. By Sir W. M. Conway. [Abstract.]

Argentine Republic.

Memoria del Departamento del Interior correspondiente al año 1899. 2 vols. Buenos Aires, 1900. Size 10½ × 7, pp. (vol. i.) 292; (vol. ii.) viii. and 850. *Plan. Presented by Dr. F. P. Moreno.*

These reports contain a large amount of useful statistical information, both on the republic as a whole and on the separate territories. The decrees creating the new "Territorio de los Andes," and dividing it into three departments, are reproduced.

Argentine Republic. **Daireaux.**

Exposé du progrès de la géographie économique de la République Argentine au XIX^e^ siècle. Par M. Émile Daireaux. (Congrès International de Géographie économique et commerciale. Rapports sur les questions mises spécialement à

l'étude. 4e section—Question II.) Paris: Société de Géographie Commerciale. Size 11 × 7, pp. 20.

Argentine Republic. *An. S. Ci. Argentina* **50** (1900): 166–171. **Furque.**

Las ruinas de Londres de Quinmivil (Catamarca). Por Hilarión Furque. *Plan.*

On ruins of a fortified town, probably Spanish, and dating from the 16th century.

Argentine Republic—Bermejo Expedition. **Dobson.**

A short account of the Leach Bermejo Expedition of 1899, with some reference to the Flora, Fauna, and Indian tribes of the Chaco. By A. A. G. Dobson. Buenos Aires: J. Smart, 1900. Size 7 × 5, pp. 74. *Illustr. Presented by the Author.*

An interesting short narrative of the expedition described in the *Journal* for June last (vol. xv. p. 599). Incidentally the writer gives useful notes on the resources and prospects of the regions traversed.

Bolivia—Andes. *B.S.G. La Paz* **2** (1900): 83–85. **Ballesteros.**

Apuntaciones para el mapa publicado por Sir Martin Conway en el Boletín de la Real Sociedad Geográfica de Londres. (Cordillera Real de Bolivia.)

On some points of nomenclature suggested by Sir M. Conway's map.

Bolivia—Santa Cruz. *B.S.G. La Paz* **2** (1900): 93–115. **Guardia.**

Datos para la Monografía del Departamento de Santa Cruz. Por F. Guardia.

Brazil. *Scottish G. Mag.* **17** (1901): 11–30. **Kœttlitz.**

From Para to Manaos: a trip up the Lower Amazon. By Reginald Kœttlitz. *With Illustrations.*

Brazil and Argentine Republic. **Rancourt.**

Étienne de Rancourt. Fazendas et Estancias. Notes de voyage sur le Brésil et la République Argentine. Paris: Plon-Nourrit & Cie., 1901. Size 7½ × 5, pp. 288. *Map and Illustrations. Price* 3*s.*

This work contains some useful information on the agricultural resources of portions of Southern Brazil and the Argentine, and especially on the coffee production of the state of São Paulo.

Brazil—Topaz. *American J. Sci.* **11** (1901): 25–34. **Derby.**

On the mode of occurrence of Topaz near Ouro Preto, Brazil. By Orville A. Derby. *With Illustrations.*

Central America. *Verh. Ges. Erdk. Berlin* **27** (1900): 417–426. **Sapper.**

Dr. Carl Sapper: Ergebnisse seiner Reisen in Mittel-Amerika. *With Map.*

An abstract of this paper is given at p. 432, *ante.*

Central America. *Petermanns M.* **47** (1901): 25–40. **Sapper.**

Beiträge zur Ethnographie des südlichen Mittelamerika. Von Dr. Carl Sapper. *With Map.*

Central America—Lake Nicaragua. *B.G.S. Philadelphia* **3** (1901): 1–20. **Heilprin.**

The Shrinkage of Lake Nicaragua.

The Water Supply of Lake Nicaragua. By Angelo Heilprin.

Prof. Heilprin here brings forward more evidence in support of his view that the level of Lake Nicaragua has fallen steadily during the last fifty years (*cf. Journal*, vol. xv. p. 648), and replies to criticisms by the hydrographer of the Canal Commission.

Chile. *Petermanns M.* **47** (1901): 11–18. **Martin.**

Llanquihue und Chiloe, Südchile. Von Dr. C. Martin. *With Map.*

Dutch Guiana. *Tijds. K. Ned. Aard. Genoots. Amsterdam* **18** (1901): 80–88. **Cappelle.**

De expeditie van Cappelle naar Suriname's Binnenland.

On an expedition made last year to the upper Nikeri river.

French Guiana. *A travers le Monde, Tour du Monde* **7** (1901): 25–28. **Montclavel.**

De Cayenne à l'Oyapock. Par M. Roland Montclavel. *With Illustrations.*

On a journey by F. Geay in 1897–98.

French Guiana and Brazil. *Ann. G.* **10** (1901): 68–70. **Vidal de la Blache.**

Le contesté franco-brésilien. Par P. Vidal de la Blache. *With Map.*

French and Brazilian Guiana. *Questions Dipl. et Colon.* **11** (1901): 31–37. **Bernard.**

Le Contesté franco-brésilien. Par M. A. Bernard. *With Map.*

French and Brazilian Guiana. *Rev. Française* **26** (1901): 70–76. **Vasco.**

L'arbitrage du contesté Franco-Brésilien. Par M. G. Vasco.

Guatemala. **Maudslay.**

Biologia Centrali-Americana. Edited by F. Ducane Godman. Archæology. By A. P. Maudslay. Part xiv. (Text and Plates), February, 1901. London: R. H. Porter. Size (Text) 13½ × 10½, (Plates) 13½ × 20½.

Patagonia. *B.G.S. Philadelphia* **2** (1900): 139–145. **Hatcher.**

The Lake Systems of Southern Patagonia. By J. B. Hatcher. *With Map.*

Patagonia. *Globus* **78** (1900): 333–338, 357–360. **Hauthal.**

Die Haustiereigenschaft des Grypotherium domesticum Roth, die Glacialverhältnisse bei Ultima Esperanza und die Berechtigung des Namens Grypotherium domesticum. Von Prof. R. Hauthal. *With Map and Illustration.*

The writer insists that the cave in which the remains of a Mylodon-like animal were discovered in 1898, was inhabited during the inter-glacial period.

Patagonia. **De la Vaulx.**

Comte Henry De la Vaulx. Voyage en Patagonie. Paris: Hachette & Cie., 1901. Size 7½ × 5, pp. xvi. and 284. *Map and Illustrations. Price* 3*s.*

Account of a journey made in 1896–97 with the support of the French Ministry of Public Instruction. The author traversed the whole of Patagonia from north to south, in great part along the eastern foot of the Andes.

Patagonia. **Gribaudi.**

Prof. Pietro Gribaudi. Il progetto di colonizzazione Italiana della Patagonia. (Estratto dalla *Rivista Geografica Italiana*, Anno iv. Fasc. vi.–vii., 1900.) Firenze, 1900. Size 9½ × 6½, pp. 16. *Presented by the Author.*

On a scheme drawn up in 1899 by General R. Garibaldi, according to which the concession of a vast area in the governments of the Rio Negro, Neuquen, Chubut, Santa Cruz, and Tierra del Fuego would be purchased from the Argentine Government with a view to colonization by Italians.

Peru. [Gepp.]

Geographical and Statistical Synopsis of Peru, 1895 to 1898. New Edition. Lima, 1899. Size 10½ × 7½, pp. 32.

Peru—Chimu. *Norske G. Selsk. Aarb.* **11** (1899–1900): 1–16. **Nielsen.**

Chimúfolket og dets gamle Kultur af prof. dr. Yngvar Nielsen. *With Illustrations.*

On the builders of the ancient city of Chimu, in the province of Trujillo.

Peru—Railway. *B.S.G. Com. Bordeaux* **26** (1900): 449–453. **Molinié.**

Le chemin de fer transandin du Pérou. Par M. H. Molinié.

Description of the railway from Callao to Oroya.

Porto Rico—Census. ———

Report on the Census of Porto Rico, 1899. Washington, 1900. Size 9½ × 6, pp. 418. *Maps and Plates. Presented by the U.S. War Department.*

The main results of the census, as summarized by Mr. H. Gannett, are referred to at p. 432, *ante*.

Porto Rico—El Yunque. *Sierra Club B.* **3** (1900): 127–134. **McClure.**

Ascent of "El Yunque." By N. F. McClure.

South America. *Jahresb. G. Ges. München* (1898–1899): 8–36. **Speidel.**

Bericht über die Reise I. K. H. Prinzessin Therese von Bayern nach Südamerika im Jahre 1898 erstattet von Albert Frhrnvon Speidel. *With Plates.*

South America. *Jahresb. G. Ges. München* (1898–1899): 1–7. **Therese.**

Zwecke und Ergebnisse meiner im Jahre 1898 nach Südamerika unternommenen Reise. Von Therese, Prinzessin von Bayern.

The principal objects of the princess's journey were the study of the distribution of the flora, and the animal life, of the lowlands of Colombia and Ecuador, and of the Andes and their plateau lands.

Trinidad—Cane-farming. *West Indian B.* **2** (1901): 33–41. **Carmody.**

Cane-farming in Trinidad. By Prof. P. Carmody.

AUSTRALASIA AND PACIFIC ISLANDS.

Australia—Flora. *J. of T. Victoria I.* **32** (1900): 106–146. **Woolls.**

Remarks on the Past, Present, and Future of the Australian Flora. By the Rev. W. Woolls, PH.D.

Australia—Glacial Epochs. *Z. Ges. Erdk. Berlin* **35** (1900): 239–286. **Penck.**
Die Eiszeiten Australiens. Von Prof. Dr. Albrecht Penck. *With Map.*
See note, *ante*, p. 308.

Australia—Railways. *Deutsche Rundschau G.* **23** (1901); 212–218. **Jung.**
Die Eisenbahnen des Australcontinents. Von Dr. Emil Jung. *With Map.*

German New Guinea. *Globus* **79** (1901): 101–105. **Erdweg.**
Ein Besuch bei den Varópu (Deutsch-Neu-Guinea). Von P. J. Erdweg.
The Varópu are a little-known tribe in the west of German New Guinea, and the writer is a missionary settled at Berlinhafen, near their district.

German New Guinea. *Ann. Hydrographie* **29** (1901): 8–16. **Schack and Hering.**
Zur Küstenkunde des Bismarck-Archipels. *With Charts.*
Gives the native names of seventeen islands of the Admiralty group.

Kerguelen Island. *T.R.S. South Australia* **24** (1900): 104–108. **Tate.**
On the Occurrence of Marine Fossiliferous Rocks at Kerguelen Island. By Prof. Ralph Tate. *With Plates.*
Gives the results of observations by Mr. Robert Hall, of Melbourne, during a visit to Kerguelen in 1898.

Marshall and Caroline Islands. **Schack, Domnick, and Krebs.**
Ann. Hydrographie **29** (1901): 1–8.
Zur Küstenkunde der Marschall- und Carolinen-Inseln. *With Charts.*

New Caledonia. *Questions Dipl. et Colon.* **11** (1901): 157–162. **Garnier.**
L'Agriculture en Nouvelle-Calédonie. Par M. Charles Garnier. *With Map.*

New South Wales.
Annual Mining Report of the Department of Mines and Agriculture, New South Wales, for the year 1899. Sydney, 1900. Size 13½ × 8½, pp. 232. *Map, Plans, and Illustrations.*
The minerals won during 1899 reached a value of £6,157,557, or over a million in excess of that for the previous year. The largest increases were in gold, silver-lead, silver, and copper.

New South Wales. *Travel* **5** (1901): 393–397. **Wrench.**
The Coastland Districts of New South Wales. By G. T. Wrench. *With Illustrations.*

New Zealand. *T. and P. New Zealand I.*, 1899, **32** (1900): 183–188. **Hill.**
On the Geology of the District between Napier and Puketitiri. By H. Hill.

New Zealand. *T. and P. New Zealand I.*, 1899, **32** (1900): 159–183. **Hutton.**
The Geological History of New Zealand. By Captain F. W. Hutton, F.R.S.

New Zealand. *J.R.I. British Architects* **7** (1900): 481–491. **Seager.**
Architectural Art in New Zealand. By S. Hurst Seager. *With Illustrations.*

New Zealand—Lake Takapuna. **Pond.**
T. and P. New Zealand I., 1899, **32** (1900): 241–242.
On the Percentage of Chlorine in Lake Takapuna. By J. A. Pond.
On tests of the lake-water at different depths, made with a view to proving whether the lake contains a substratum of sea-water. The result was in the negative.

New Zealand—Maoris. *T. and P. New Zealand I.* 1899, **32** (1900): 253–270. **Smith.**
The Tohunga-Maori: a Sketch. By S. Percy Smith.
On the priest and his functions, among the Maoris.

New Zealand—Maori Place-names. **White.**
T. and P. New Zealand I., 1899, **32** (1900): 347–352.
About the Native Names for Places. By Taylor White.

New Zealand—Nelson. *T. and P. New Zealand I.*, 1899, **32** (1900): 221–225. **Worley.**
On the Nelson Boulder Bank. By W. F. Worley. *With Sections.*

Western Australia.
Western Australia. Report of the Department of Mines for the year 1899. Perth, 1900. Size 13 × 8½, pp. 286. *Maps and Diagram. Presented by the Department of Mines, Perth.*
The total yield of gold in 1899 is reported as reaching a value of £1,600,768, as compared with £1,041,712 in 1898. Of this sum the East Coolgardie field accounts for 53·44 per cent.

POLAR REGIONS.

Antarctic. **Borchgrevink.**

First on the Antarctic Continent, being an account of the British Antarctic Expedition 1898–1900. By C. E. Borchgrevink. London: George Newnes, Ltd., 1901. Size 9 × 6, pp. xvi. and 334. *Portraits, Maps, and Illustrations. Price* 10*s.* 6*d. Presented by the Publisher.*

This work is practically an extension of the paper read last year before the Society, being a personal narrative of the course of the "Newnes" Antarctic Expedition, profusely illustrated from the excellent photographs taken by various members of the staff. Apart from the Appendices by Mr. Bernacchi and Lieut. Colbeck, it adds little to our knowledge of the scientific results of the expedition, which, it is to be hoped, will eventually be published in full.

Antarctic—German Expedition. *Petermanns M.* **47** (1901): 19–20. **Vanhöffen.**

Von der deutschen Südpolarexpedition, Fischereiversuche. Von Dr. Ernst Vanhöffen.

On the proposed study of the fishes (especially economic) of the antarctic by the German expedition.

Antarctic—German Expedition. **Oberhummer**

Jahresb. G. Ges. München (1898-1899): 94–134.

Die Deutsche Südpolarexpedition. Zweiter Bericht der Geographischen Gesellschaft in München erstattet von Prof. Dr. Eugen Oberhummer. *With Map.*

A report of progress down to November last.

Antarctic—Ice Caps. *C. Rd.* **131** (1900): 1260–1262. **Arctowski.**

Les calottes glaciaires des régions antarctiques. Note de M. Henryk Arctowski.

Antarctic—"Southern Cross" Expedition.

The Antarctic Expedition. Conversazione at the Town Hall [Hobart], Wednesday, April 18, 1900. Welcome to the Leader, Scientific Staff, Captain, and Men. Size 8½ × 5½, pp. 14.

Antarctic—Zoology. *C. Rd.* **132** (1901): 168–169. **Topsent.**

Les Spongiaires de l'expédition antarctique belge et la bipolarité des faunes. Note de M. E. Topsent.

Arctic—Abruzzi Expedition. *Riv. G. Italiana* **8** (1901): 49–59. **Abruzzi and Cagni.**

La Conferenza del Duca degli Abruzzi e del Comandante Cagni alla Società Geografica Italiana.

Arctic—Andrée's Expedition. *Naturw. Wochenschrift* **16** (1901): 20–22. **Lorenzen.**

Die Nachrichten von der Expedition Andrée's. Von A. Lorenzen.

Arctic—Bear Island. *Ymer* **20** (1900): 423–454. **Andersson.**

Den Svenska expeditionen till Beeren Eiland sommaren 1899. Af Joh. Gunnar Andersson. *With Sketch-maps and Illustrations.*

Arctic Exploration. *T. and P. New Zealand I.*, 1899, **32** (1900): 384–396. **Hill.**

Problems of Arctic Exploration bearing upon Recent Attempts to reach the North Pole. By H. Hill.

Arctic—Italian Expedition. *B.S.G. Italiana* **2** (1901): 121–180. **Abruzzi and Cagni.**

Spedizione italiana nel Mare Artico sulla "Stella Polare." Conferenza da S.A.R. il Duca degli Abruzzi e dal Comandante U. Cagni. *With Maps and Plates.*

Arctic-Norwegian Expedition—Scientific Results. **Nansen.**

The Norwegian North Polar Expedition, 1893–1896. Scientific Results, edited by Fridtjof Nansen. Volume ii. London: Longmans & Co., 1901. Size 12 × 9½, pp. lx., 136, 196, and 90. *Charts and Diagrams. Price* 30*s. net. Two Copies, one presented by the Council of the Fridtjof Nansen Fund, the other by the Publishers.*

This volume is produced in the same excellent style which marked its predecessor, issued early last year. The first section (sixth of the whole work) consists of a full discussion of the astronomical observations and statement of their results, by H. Geelmuyden. As regards the observations taken during the sledge expedition, including that which determined the most northerly point reached, it is frankly acknowledged that, taken as they often were during an actual struggle for life, in temperatures down to −40° C. (−40 Fahr.), they could not attain any high degree of accuracy. This does not, however, affect the general correctness of the results. The rest of the volume is made up with the results as regards terrestrial magnetism, pendulum observations, etc., by Aksel S. Steen and O. E. Schiøtz.

Greenland. *Verh. Ges. Erdk. Berlin* **27** (1900): 427–432. **Conwentz.**

Zur Verbreitung des Moschusochsen und anderer Tiere in Nordost-Grönland. Von Prof. Dr. Conwentz. *With Map.*

Based on Dr. Nathorst's observations (cf. *ante*, p. 310).

Polar Exploration. **Hugues.**

Luigi Hugues. Le Esplorazioni Polari nel secolo xix. Milan: Ulrico Hoepli, 1901. Size 10 × 7, pp. xx. and 374. *Maps and Illustrations. Price* 12 *lire. Presented by the Publisher.*

A useful summary of arctic and antarctic exploration during the nineteenth century. It has been compiled with much care, and though the accounts of the separate voyages are necessarily brief, no important name has been omitted.

Polar Exploration. *Globus* **79** (1901): 13–17. **Singer.**

Die Polarforschung im Jahre 1900. Von H. Singer.

Polar Regions—Discovery. *Riv. G. Italiana* 8 (1901): 18–41. **Porena.**

Le scoperte geografiche del secolo xix. del Prof. Filippo Porena. V. Le Terre Polari.

MATHEMATICAL GEOGRAPHY.

Cartography. *M.G. Ges. Wien* **43** (1900): 31–48, 268–299. **Peucker.**

Studien am Atlante Scolastico per la Geografia Fisica e Politica di Giuseppe Pennesi. Von Dr. Karl Peucker. *Also separate copy, presented by the Author.*

Cartography. *Izvestiya Russ. G.S.* **36** (1900): 457–462. **Vitkovski.**

Advantages of an Equal-area Conical Projection. By V. Vitkovski. [In Russian.]

Cartography. **Zondervan.**

Allgemeine Kartenkunde. Ein Abriss ihrer Geschichte und ihrer Methoden von Henri Zondervan. Leipzig: B. G. Teubner, 1901. Size 9½ × 6, pp. x. and 210. *Illustrations. Price* 4.60 *m. Presented by the Publisher.*

A revised translation of the work which appeared in Dutch in 1898, with additional illustrations. It forms a useful summary of the history and methods of map-making.

Cartography. **Margerie and Raveneau.**

La Cartographie à l'Exposition Universelle de 1900. Par Emm. de Margerie et Louis Raveneau. Extrait des *Annales de Géographie*, tome ix., 1900 (No. 46 du 15 Juillet et 48 du 15 Novembre, 1900). Paris: A. Colin. Size 10 × 6½, pp. [52].

Cartography. *G.Z.* **7** (1901): 22–41. **Peucker.**

Zur Kartographischen Darstellung der dritten Dimension. Von Dr. Karl Peucker.

A note will be given on this.

Determination of Position. *Ann. Hydrographie* **28** (1900): 584–585. **Bolwin.**

Nochmals die Bestimmung des Schiffsortes nach St. Hilaire ohne Konstruktion. Von G. Bolwin.

Determination of Position. *Rev. Maritime* **147** (1900): 491–510. **Decante.**

Détermination de la position du navire quand l'horizon n'est pas visible. Par C. Decante.

Figure of the Earth. *Ann. Hydrographie* **28** (1900): 590–601. **Messerschmitt.**

Ueber den Verlauf des Geoids auf den Kontinenten und auf den Ozeanen. Von Dr. J. B. Messerschmitt.

Map Projection. *American J. Sci.* **11** (1901): 1–24, 115–144. **Penfield.**

The Stereographic Projection and its Possibilities, from a Graphical Standpoint. By S. L. Penfield. *With Illustrations.*

Nautical Almanac. ———

The American Ephemeris and Nautical Almanac for the year 1903. Washington: Bureau of Equipment, 1900. Size 11 × 7½, pp. 592. *Diagrams.*

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Atmospheric Electricity. *Meteorolog. Z.* **17** (1900): 529–543. **Exner.**

Ueber neuere Untersuchungen auf dem Gebiete der atmosphärischen Elektricität. Von Prof. Franz Exner.

Biogeography. *Science* **12** (1900): 857–864. **Ihering.**
The History of the Neotropical Region. By Dr. H. von Ihering.

Earthquakes. *T. Ottawa Lit. and Sci. S.*, No. 2 (1899–1900): 119–132. **Stupart.**
Earthquakes and the Seismograph. By R. F. Stupart. *With Diagrams.*

Forests and Climate. *Meteorology. Z.* **17** (1900): 561–564. **Schubert.**
Prof. Dr. Schubert: Der Einfluss der Wälder auf das Klima.

Geology—Age of the Earth. *Brit. Assoc. Rep.* (1900): 369–379. **Joly.**
On the Geological Age of the Earth. By Prof. J. Joly, D.SC., F.R.S.
On the method of estimating the age of the Earth by taking the amount of sodium contained in the sea as a measure of solvent denudation.

Geomorphology. *Geolog. Mag.* **8** (1901): 20–23. **Tiddeman.**
On the Formation of Reef Knolls. By R. H. Tiddeman.

Geomorphology—Cirques. *Ann. G.* **10** (1901): 10–16. **Martonne.**
Sur la formation des cirques. Par E. de Martonne. *Also separate copy, presented by the Author.*
Based on a detailed survey by the writer of two typical *cirques* on the Paringu, Carpathians.

Gravity. *T. Ottawa Lit. and Sci. S.* No. **2** (1899–1900): 149–161. **Klotz.**
Local Deflection of the Plumb Line. By Otto J. Clotz. *With Maps and Diagrams.*

Land-forms. **Davis.**
The Physical Geography of the Lands. By Prof. W. M. Davis. (Reprinted from *Popular Science Monthly*, vol. lvii. No. 2, pp. 157–170, June, 1900.) Size 9½ × 6½. *Presented by the Author.*
Illustrates the need for explanation and correlation in the study of land-forms.

Limnology. *Rev. G.* **48** (1901): 125–130. **Corcelle**
La Limnologie, Études nouvelles sur les lacs français. Par J. Corcelle.

Meteorology. *P. Philosoph. S. Glasgow* **31** (1899–1900): 145–151. **Robertson.**
On the Equilibrium of a Column of Air, and the Atmospheric Temperature Gradient. By David Robertson, B.SC.

Meteorology—Atmospheric Movements. **Bjerknes.**
Monthly Weather Rev. **28** (1900): 434–443.
The dynamic principle of the circulatory movements in the atmosphere. By Prof. V. Bjerknes. *With Diagrams.*

Meteorology—Methods *P.R.J.* **16** (1900): 97–113. **Callendar.**
Measuring Extreme Temperatures. By Prof. H. L. Callendar.

Meteorology—Rainfall. **Herbertson.**
The Distribution of Rainfall over the Land. By Andrew J. Herbertson, PH.D. London: John Murray, 1901. Size 10 × 6½, pp. 70. *Maps and Diagrams.*
This is one of the extra publications of the Royal Geographical Society. It is a careful study, based on all available information, of the distribution of rainfall over the Earth's surface, and gives for the first time rainfall maps of the whole world for each separate month of the year.

Meteorology—Tropical Rainfall. *Meteorolog. Z.* **17** (1900): 572–574. **Hann.**
Beiträge zur Kenntniss tropischer Regenverhältnisse. Von J. Hann.

Oceanography. *Ann. Rep. Smithsonian I.* (1898): 407–425. **Thoulet.**
Oceanography. By M. J. Thoulet.
Translation of an article in the *Revue des Deux Mondes.*

Oceanography—Baltic. *Ann. Hydrographie* **28** (1900): 586–590. **Knudsen.**
Erneuerung der unteren Wasserschichte in der Ostsee. Von Martin Knudsen.

Oceanography—Black Sea. *Die Natur* **50** (1901): 1–4, 13–15, 25–58. **Toula.**
Die geologische Geschichte des schwarzen Meeres. Von Hofrat Prof. F. Toula.

Oceanography—Density. *C. Rd.* **131** (1900): 1267–1269. **Thoulet.**
Sur la détermination de la densité de l'eau de mer. Note de M. J. Thoulet. [Extrait.] (*Also separate copy, presented by the Author.*)

Oceanography—North Atlantic. **Dickson.**

The Circulation of the Surface Waters of the North Atlantic Ocean. By H. N. Dickson, B.Sc. (Philosophical Transactions of the Royal Society of London. Series A. Vol. 196, pp. 61–203.) London: Dulau & Co., 1901. Size 12 × 9. *Maps. Price* 10*s. Presented by the Author.*

This important paper will receive special notice.

Regional Geography. **Gribaudi.**

Prof. Pietro Gribaudi. Un buon esempio da imitarsi per lo studio della geografia di casa nostra. (Estratto dalla *Rivista Geografica Italiana*. Anno vii. Fasc. ix., 1900.) Firenze, 1900. Size 9½ × 6½, pp. 8. *Presented by the Author.*

The writer urges the importance of a study of the Regional Geography of Italy, on the lines of Dr. Mill's proposed monographs of the Ordnance Survey Sheets.

Regional Geography. *Riv. G. Italiana* **7** (1900): 599–602. **Marinelli.**

Un esempio nostrale, a proposito di monografie locali. Nota di olinto Marinelli.

The writer calls attention to a memoir recently issued by the "Stazione Sperimentale agraria di Udine," as an excellent example of the treatment of regional geography on the lines advocated for Great Britain by Dr. Mill.

Rivers. *B. American Bureau G.* **1** (1900): 337–341. **Dowling.**

A Study of the River. By Ruth E. Dowling.

Terrestrial Magnetism. *C. Rd.* **132** (1901): 30–32. **Moureaux.**

Sur la valeur absolue des éléments magnétiques an 1er janvier 1901. Note de M. Th. Moureaux.

Terrestrial Magnetism. *Terrestrial Magnetism* **5** (1900): 97–110. **Nippoldt.**

The present status of the theory of the Earth's Magnetism. By A. Nippoldt.

Wave Surfaces. *Scottish G. Mag.* **17** (1901): 1–11. **Cornish.**

On the Formation of Wave Surfaces in Sand. By Vaughan Cornish. *With Illustrations.*

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

Anthropology—The Basques. *Globus* **79** (1901): 117–124. **Buschan.**

Der Stand unserer Kenntnis über die Basken. Von Georg Buschan.

Civilizations. **Matteuzzi.**

Les facteurs de l'évolution des l'euples, ou l'influence du milieu physique et tellurique et de l'hérédité des caractères acquis dans l'évolution et la dissolution des peuples, par le Dr Auguste Matteuzzi, traduit de l'italien par Mlle I. Gatti de Gamond. Paris: F. Alcan, 1900. Size 8½ × 5½, pp. 412. *Presented by the Author.*

A thoughtful study of the development of civilizations as influenced by environment coupled with the persistence of acquired characters.

Commerce. **Levasseur.**

Des changements survenus au XIXe siècle dans les conditions du commerce par suite du progrès des voies et moyens de communication. Par M. Émile Levasseur. (Congrès International de Géographie économique et commerciale. Rapports sur les questions mises spécialement à l'étude. 1re section—Question ii.) Paris: Société de Géographie Commerciale. Size 11 × 7, pp. 36.

Commercial—Coal Supply.

Internal Commerce. Coal Trade of the United States and the World's Coal Supply and Trade. [From the Summary of Commerce and Finance for April, 1900.] Treasury Department, Bureau of Statistics. Size 12 × 9½, pp. 2817–2928. *Diagram. Presented by the Philadelphia Commercial Museums.*

Commercial—Free Port. **Roux.**

Des meilleures conditions de l'établissement d'un port Franc. Par Charles Roux. (Congrès International de Géographie économique et commerciale. Rapports sur les questions mises spécialement à l'étude. 1re Section—Question iii.) Paris: Société de Géographie Commerciale. Size 10½ × 7, pp. 22.

Commercial Geography. **Aspe-Fleurimont.**

De la création, de l'organisation et de l'outillage des grands marchés de denrées et de matières premières. Par M. Aspe-Fleurimont. (Congrès International de Géographie économique et Commerciale. Rapports sur les questions mises spécialement à l'étude. 2e Section—Question II.) Paris: Société de Géographie Commerciale. Size 11 × 7, pp. 6.

Commercial Geography. **Spire.**

Quelles sont les meilleures conditions d'organisation d'une Exploration économique et commerciale. Par le Docteur Spire. (Congrès International de Géographie économique et commerciale. Rapports sur les questions mises spécialement à l'étude. 1re Section—Question i.) Paris: Société de Géographie Commerciale. Size 10½ × 7, pp. 16.

Commercial Geography—Cork Oak. *Abh. G. Ges. Wien* **2** (1900): 239–313. **Müller.**

Ueber die Korkeiche (Quercus suber L. und occidentalis Gay). Ein Beitrag zur Pflanzen- und Handelsgeographie. Von Dr. Eugen Anton Müller. *With Map and Diagrams.*

A careful study of the distribution, history, and economic importance of the cork oak.

Commercial—Paraguay-tea. **Fischer-Treuenfeld.**

Deutsche Rundschau G. **23** (1901): 193–210.

Paraguaythee. Von R. v. Fischer-Treuenfeld. *With Illustrations.*

Commercial—Timber Production. *Ann. G.* **10** (1901): 72–75. **Raveneau.**

La production du bois dans le monde. Par L. Raveneau.

Historical—Dias. *Die Natur* **50** (1901): 7–9, 15–18. ———

Die erste Umsegelung des Kaps der guten Hoffnung durch Bartholomeu Dias. Von H. B.

BIOGRAPHY.

Drapeyron. *Rev. G.* **48** (1901): 83–88. **Levasseur and others.**

M. Ludovic Drapeyron. Obsèques de M. Ludovic Drapeyron, Directeur de la *Revue de Géographie.*

Ibarreta. *Deutsche Rundschau G.* **23** (1901): 181–184. **Greger.**

Enrique de Ibarreta. Von J. Greger. *With Portrait.*

The subject of this memoir was murdered by the Indians of the Gran Chaco, as already announced in the *Journal.*

Korshinsky. *Deutsche Rundschau G.* **23** (1901): 231–232. **Stenin.**

Prof. S. J. Korshinsky. Von P. v. Stenin. *With Portrait.*

Prof. Korshinsky, who died in December last, was one of the best authorities on the flora of the Russian empire.

Pinto. *Rev. Française* **26** (1901): 90–105. **Joûbert.**

L'explorateur Portugais Serpa Pinto. Par M. J. Joûbert.

Pinto. *A travers le Monde, Tour du Monde* **7** (1901): 29. ———

Serpa Pinto. *With Portrait.*

Preuss. *Deutsche Rundschau G.* **23** (1901): 229–230. ———

Dr. Paul Rudolf Preuss. *With Portrait.*

Torell. *Ymer* **20** (1900): 455–459. **Nathorst.**

Otto Torell den vetenskapliga polarforskningens grundläggare. Af A. G. Nathorst. *With Portrait.*

Volkens. *Deutsche Rundschau G.* **23** (1901): 179–181. ———

Prof. Dr. Georg Volkens. *With Portrait.*

Prof. Volkens, well known for his botanical work on Kilimanjaro, has lately returned from a scientific expedition to the Carolines.

Waldseemüller. *B.S.G. de l'Est* **21** (1900): 221–229. **Gallois.**

Waldseemüller chanoine de Saint-Dié. Par L. Gallois.

GENERAL.

Acclimatization. *B.S.G. Lyon* **17** (1901): 44–66. **Sambon.**

L'acclimatation des Européens dans les régions tropicales. Par M. le Docteur L. Westenra-Sambon.

Alpine Club. *Alpine J.* **20** (1901): 295–305. **Conway and Freshfield.**

The Future of the Alpine Club. By Sir Martin Conway and Douglas W. Freshfield.

Proposals for the modification of the qualifications for the Alpine Club, and of the form of its *Journal*, so as to make the latter a complete record of mountain exploration in all parts of the globe.

Belgium. *B.S.R. Belge G.* **24** (1900): 233–258, 281–312. **Du Bois.**

Le Réveil de la tendance des Belges à s'expatrier. Par Albert Du Bois.

On the recent awakening of Belgium to colonial enterprise, and the need for a Belgian merchant marine.

Climate and Health. *B.S. d'Études Colon.* **8** (1901): 27–33. ——

De la dégénérescence de la race européenne sous le climat équatorial.

Cologne Geographical Society. *Rev. G.* **48** (1901): 10–18. **Drapeyron.**

Une société allemande de géographie. La Société de géographie de Cologne; son organisation (1886–1900). Par L. Drapeyron.

Colonial Companies. ——

Recueil des Sociétés Coloniales et Maritimes. Deuxième Année, 1901. Bruxelles: Société d'Études Coloniales de Belgique, 1901. Size 9½ × 6, pp. vi. and 386. *Map. Presented by the Société d'Études Coloniales.*

Statistical information respecting the principal colonial and shipping companies of European powers, especially Belgium. Of British companies, only those having dealings with Africa are mentioned, only ten pages in all being devoted to these.

Colonial Systems. ——

Colonial Systems of the World. The Colonies, Protectorates, Dependencies, and Spheres of Influence of all Nations exercising authority outside their immediate territory; showing form of government, area, population, revenue, etc. [From Summary of Commerce and Finance for December, 1898.] Treasury Department, Bureau of Statistics. Size 12 × 9½, pp. 38. *Map. Presented by the Philadelphia Commercial Museums.*

Education. *B. American Bureau G.* **1** (1900): 301–308. **Allin.**

Some Pedagogical Principles underlying the Teaching of Geography. By Arthur Allin.

Education—Pictures. *B. American Bureau G.* **1** (1900): 309–315. **Wood.**

Pictures in the Teaching of Geography. By John A. Wood.

Exhibition. *National G. Mag.* **12** (1901): 49–53. **Austin.**

An Around-the-World American Exposition. By Hon. O. P. Austin. *With Map.*

A suggestion for a floating exhibition, to carry samples of American merchandise all over the world.

Fishery Congress. ——

Travaux et comptes-rendus des séances du Congrès International de Pêches Maritimes et Fluviales de Bayonne-Biarritz du 25 au 31 Juillet 1899. Paris: A. Challamel, 1900. Size 10 × 6½, pp. xxiv. and 184. *Plates.*

Geographical Names. *B. American Bureau G.* **1** (1900): 316–327. **Rupert.**

The significance and importance of Geographical Names. By Wm. W. Rupert.

Hints to Travellers. **Blim and Rollet de l'Isle.**

Manuel de l'Explorateur, procédés de levers rapides et de détail: détermination astronomique des positions géographiques. Par E. Blim et M. Rollet de l'Isle. Paris: Gauthier-Villars, 1899. Size 7½ × 5, pp. viii. and 260. *Illustrations. Price* 4*s.* 6*d.*

Useful hints on surveying with compass, theodolite, etc.

Medical Geography. *C.Rd.* **132** (1901): 114–117. **Lannelongue, Achard, and Gaillard.**

De l'influence du climat sur l'évolution de la Tuberculose pleuro-pulmonaire expérimentale. Par MM. Lannelongue, Achard et Gaillard.

NEW MAPS.

By E. A. REEVES, *Map Curator*, R.G.S.

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England and Wales. **Ordnance Survey.**

Ordnance Survey of England and Wales: Revised sheets published by the Director-General of the Ordnance Survey, Southampton, from March 1 to 31, 1901.

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These are three sheets of the map of portions of Asia on the scale of 1 : 1,000,000, now in course of publication by the Service Géographique de l'Armée, Paris. Sheets Nos. 32–132 and Nos. 28–132 contain the southern islands of Japan. The third sheet, entitled "Bassin Inférieur du Yang-tse-Kiang," is an important one, and includes the course of that river from Hu-keu, about sixty miles above Ngan-king, to the sea, and the country to the south and north from lat. 30° to 34° N. There is also on this sheet an explanatory note concerning the system of transliteration of Chinese names. The style in which these sheets have been produced is similar to that of the others of the same series that have already appeared.

Indian Government Surveys. **Surveyor-General of India.**

Indian Atlas, 4 miles to an inch. Sheets: 27 N.E., parts of district Ratnágiri (Bombay Presidency), 1900; 59 S.W., parts of districts Bellari and Anantapúr (Madras Presidency), Kadúr, Túmkúr, Chitaldru and Shimoga (Mysore State), 1900; 40, parts of districts Ratnágiri, Sholapur, and Satara and Kolapur Native State (Bombay Presidency), additions to 1896; 54, parts of districts Hoshangabad, Nimár, Wardha and Betúl (Central Provinces), Amráoti, Akola, Buldána and Ellichpur (Berar), Khandesh (Bombay Presidency), and of Native State Indore (C. I. Agency), additions to 1899; 80, parts of districts Madura, Tanjore and Ramnad (Madras Presidency) and Tondiman (Native State), additions to 1900.—Assam Survey, 1 inch to a mile. No. 162, North Lushai Hills, Seasons 1897–99, 1900.—Bengal Survey, 1 inch to a mile. No. 138, District Puri, Seasons 1890–91 and 94–95, 1900.—Upper Burma Survey, 1 inch to a mile. No. 403, Southern Shan States, Season 1897–98, 1900.—Central Provinces Survey, 1 inch to a mile. No. 68, parts of Districts Chhindwára, Narsinghpur and Seoni (Central Provinces), Seasons 1862–63, 1865–67, 1869–70. 1899.—Central India and Rajputana Survey, 1 inch to a mile. No. 420, parts of Districts Saugor and Damoh (Central Provinces), and Native States of Panna, Bijáwar, and Tehri (C. I. Agency), Seasons 1863–64, 65–66, and 1870–71, 1900.—Burma-China Boundary Commission, 1 inch to 4 miles, parts of the Shan States and China, Season 1898–99. 1900.—Index to the Survey of the Yenangyat Oil Field, Upper Burma, 1 inch to a mile. Sheets 124–126 (on one sheet), Pakokku District, Season 1899–1900.—District Hugli, Bengal, 1 inch to 8 miles. 1900.—District Kohát, Punjab, 1 inch to 8 miles. 1900.—Berar (with and without hill shading), 1 inch to 24 miles. 1896.—District Midnapore, 1 inch to 4 miles. 1899.—District Mymensingh, Lower Provinces, Bengal, 1 inch to 4 miles. 1900.—Rájputána Agency, 2nd edition, 1 inch to 16 miles. 1900. 2 sheets.—Western Bengal, 1 inch to 8 miles. Sheet No. 8, Districts Hazáribágh, Gaya, Sonthál Parganas, Birbhum, Burdwan, Bankura, Manbhum, Midnapore, Hugli, Singhbhum, Ránchi, Murshidábád, and Bhogalpur. 1899.—Eastern Bengal, 1 inch to 8 miles. Sheet No. 13, Murshidábád, Malda, Birbhum, Bogra, Rájsháhi, Pabna, Mymensingh, Burdwan, Hugli, Nadia, Jessore, Khulna, Backergunge, Faridpur, Dacca, Tippera and Noakhali. 1899.—Central India Agency, 1 inch to 16 miles. 1899. 2 sheets and index.—*Presented by H.M. Secretary of State for India through the India Office.*

Japan. **Yamasaki.**

Das grosse Riku-u-Erdbeben im nördlichen Honshū am 31 Aug. 1896. Scale 1 : 1,000,000 or 15·8 stat. miles to an inch. Von Dr. N. Yamasaki. *Petermanns Geographische Mitteilungen*, Jahrgang 1900. Taf. 20. Gotha: Justus Perthes, 1900. *Presented by the Publisher.*

This map is to illustrate a paper on the great Riku-u earthquake of Japan by Dr. N. Yamasaki, in *Petermanns Geographische Mitteilungen* for November, 1900. It is based upon a sheet of Hassenstein's atlas of Japan, on which the special information connected with the earthquake has been added in red.

AFRICA.

Africa. **Service Géographique de l'Armée, Paris.**

Carte d'Afrique. Scale 1 : 2,000,000 or 31·6 stat. miles to an inch. Sheets: 21, Khartoum; 29, Gondar; 30, Berbera; 33, Benin; 38, Moukdicha; 59, Ville du Cap. Service Géographique de l'Armée, Paris. *Price* 1 *fr. each sheet.*

German East Africa. **Kiepert.**

Deutsch-Ostafrika. Scale 1 : 2,000,000 or 31·6 stat. miles to an inch. Von Dr. R. Kiepert. Geographische Verlagshandlung, D. Reimer (E. Vohsen), Berlin.

A new edition of a somewhat roughly executed map of German East Africa. It is, however, useful for general reference, and shows clearly the various districts into which the country has been divided, together with the principal mineral and vegetable products, with their localities.

Tunis. **Service Géographique de l'Armée, Paris.**

Tunisie. Scale 1 : 100,000 or 1·6 stat. miles to an inch. Sheet XXVI., Djebibina. *Price* 1.20 *fr.* Tunisie. Scale 1 : 50,000 or 0·8 stat. mile to an inch. Sheets: i., Kef Abbed; XXVII., Medjez el Bab. *Price* 1.50 *fr. each sheet.* Service Géographique de l'Armée, Paris.

NORTH AMERICA.

Canada. **Department of the Interior, Ottawa.**

Map of the Dominion of Canada. Scale 1 : 6,336,000 or 100 stat. miles to an inch. Department of the Interior, Ottawa, 1901. *Presented by James White, Esq.*

This is the second edition of a small-scale, general map of the Dominion of Canada, on one sheet. It is without hill shading, but shows very clearly all the principal political divisions, by means of colour tinting. The boundaries are indicated by a black broken line, although that between British and United States territory, from Mount St. Elias to lat. 56° N., has been left undefined. The new railway from the head of the Lynn canal to Lake Bennett is laid down. The map has been compiled from the geological survey maps of Canada, and from other available maps and surveys.

Maryland. **Maryland Geological Survey.**

Physical Atlas of Maryland. Allegany County. Topography and Election Districts, Geology and Soils. Maryland Geological Survey. Scale 1 : 62,500 or 0·97 stat. mile to an inch. The John Hopkins Press, Baltimore, 1900. 6 sheets. *Presented by the Maryland Geological Survey.*

This atlas contains two maps of the Allegany County, Maryland, one showing the topography and election districts, and the other the geological formations and agricultural soils. In the former the relief is indicated by a series of brown contour-lines at intervals of 20 feet, whilst the rivers are in blue, and in the latter the geology is shown by a system of colours and conventional signs. Each of the maps consists of three sheets, which, as regards style of production, are equal to the other excellent maps of the United States Geological Survey. They are accompanied by a volume of text.

CENTRAL AND SOUTH AMERICA.

Central America. **Petermanns Geographische Mitteilungen.**

Die neue Grenze zwischen Costarica und Columbia. Scale 1 : 1,500,000 or 23·7 stat. miles to an inch. *Petermanns Geographische Mitteilungen*, Jahrgang 1900. Taf. 22. Gotha : Justus Perthes, 1900. *Presented by the Publisher.*

In addition to the new boundary between Costa Rica and Colombia as settled by arbitration in September, 1900, which is the principal feature on this map, there are two other lines indicated, showing respectively the regions previously claimed by the two countries. The new boundary runs from the Atlantic to the Pacific coast between these two lines, and passes from Pta. Mona to the watershed between the Tiliri and General, and thence south to Pta. Burica.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, January and February, 1901. *Presented by the Hydrographic Department, Admiralty.*

No.	Inches.	
117 m	= 0·4	Faroe islands. 2*s.* 6*d.*
2058 d	= 0·75	North Atlantic route chart. 2*s.* 6*d.*
171 m	= {6·5 / 4·0}	Plans on the east coast of Newfoundland :—Hooping harbour, Fourché harbour. 1*s.* 6*d.*
3141 m	= 5·9	Newfoundland :—Little Harbour deep and Union cove. 1*s.* 6*d.*
3017 m	= 4·0	Lake Superior :—Duluth and Superior harbours. 1*s.* 6*d.*
2827 m	= 6·0	Cuba, north coast :—Port Gibara. 1*s.* 6*d.*
2908 m	= 12·0	Africa, south coast :—Port Natal entrance. 1*s.* 6*d.*
1646 m	= 5·9	Bay of Bengal :—Moulmein harbour. 1*s.* 6*d.*
3154 m	= 1·4	Japan, inland sea :—Ominase to Futakami Jima. 2*s.* 6*d.*
3133 m	= 3·2	Queensland, east coast :—Cairns harbour. 2*s.*
3155 m	= 2·0	Queensland, east coast :—Flinders group. 1*s.* 6*d.*
421		Harbours on the east coast of Newfoundland, plan added :—Exploits Burnt island harbours.
98		Plans on the south coast of Cuba, plan added :—Chirivico harbour.
1156		Plans on the north-east coast of China, plan added :—South-east promontory anchorage.
1176		South Pacific, new plan :—Lagoon entrance, Suvarov islands.

(*J. D. Potter, Agent.*)

Charts Cancelled.

No.		Cancelled by	No.
117.	Fœroe islands.	New chart. Fœroe islands	117
2328.	Plans of Arendal inlet, and approaches to Grimstad on this chart.		
2058.	North Atlantic route chart.	New chart. North Atlantic route chart	2058
320.	Plan of Superior bay on this chart.	New plan. Duluth and Superior harbours	3017
418.	Plan of Port Gibara on this sheet.	New plan. Port Gibara	2827
2908.	Port Natal entrance.	New plan. Port Natal entrance	2908
1646.	Moulmein harbour.	New plan. Moulmein harbour	1646
2350.	Plan of Cairns harbour on this chart.	New plan. Cairns harbour	3133
1176.	Plan of Lagoon entrance, Suvarov islands.	New plan. Lagoon entrance, Suvarov islands	1176

Charts that have received Important Corrections.

No. A–P, Index charts, 16 sheets. Y, Index chart of Sailing Directions. 28, England, south coast:—Salcombe river. 1967, England, south coast:—Plymouth sound. 240, England, south coast:—Hamoaze 2328, Norway, south coast:—Christiansand to Sandöen. 2296, Gulf of Bothnia:—South Quarken to Hornslandet. 2298, Gulf of Bothnia, sheet iii. 2116, Denmark:—Great and Little belts. 1126, Ports and anchorages in Corsica. 1611, Ports and anchorages in Dalmatia. 1582, Harbours on the eastern shore of the Adriatic. 2961, Canada:—Eastern part of the bay of Quinte. 2580, Cuba, eastern portion. 478, Puerto Rico:—Port San Juan. Port Arecibo. 1331, Argentina:—Port Belgrano. 2431, Alaska:—Port Simpson to Cross sound. 2463, Alaska:—Port McArthur to Windham bay. 1843, Africa, south coast:—Buffalo river. 851, Mosambique channel:—Bassas da India and Europe island. 923, Harbours and anchorages in the Red sea. 942A, Eastern archipelago, eastern portion. 932, Harbours and anchorages on the coasts of Java. 2575, Celebes sea, eastern part. 1760, China, east coast:—The Brothers to Ockseu islands. 2409, China sea:—West coast of Formosa. 127, Japan:—Hirado-no-Seto to Simonoseki strait. 2710, Japan:—Tsu-sima sound. 1485, Caroline islands:—Yap island. Port Tomil.

(*J. D. Potter, Agent.*)

North Atlantic Ocean. **Meteorological Office, London.**

Charts illustrating the Weather of the North Atlantic Ocean in the Winter of 1898–99. Published by the Meteorological Office, London, 1901. *Price* 6*s.* 6*d.* *Presented by the Meteorological Office.*

The succession of severe gales over the North Atlantic Ocean during the winter of 1898–99, taken in conjunction with the remarkable climatic conditions on both sides of the ocean, form a most interesting subject for investigation. It has, therefore, been considered advisable by the Meteorological Council to prepare a permanent meteorological record of the North Atlantic for this period, and this has been accomplished, as perfectly as the observations available has rendered possible, in the above-mentioned charts, which indicate the state of the barometer, thermometer and wind for each day from December 18, 1898, to February 15, 1899. These are all drawn on one scale, and are accompanied by notes which add to their interest. They have been prepared from a great number of observations and records, which have been placed at the disposal of the Meteorological Council by the various shipping companies. The responsible and laborious task of compilation was entrusted in the first place to the late Navigating Lieut. C. W. Baillie, R.N., and after his death, which has occasioned some delay in the publication of the charts, the work has been completed by Commander Campbell Hepworth, R.N.R.

North Atlantic Ocean and Mediterranean Sea. **Meteorological Office, London.**

Monthly Pilot Chart of the North Atlantic Ocean and Mediterranean Sea for April, 1901. Issued by the Meteorological Office, London. *Price* 6*d.* *Presented by the Meteorological Office.*

United States Charts. **United States Hydrographic Office.**

Pilot Charts of the North Atlantic Ocean for March and April, 1901, and of the North Pacific for April, 1901. U.S. Hydrographic Office, Washington, D.C. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

Sierra Leone. **Alldridge.**

Twenty-eight Photographs of the Hinterland of Sierra Leone, by T. J. Alldridge, Esq. *Presented by T. J. Alldridge, Esq.*

During Mr. Alldridge's journeys in Sierra Leone he has travelled in some of the districts of the interior concerning which comparatively little information has been obtained, and the photographs he has taken, a set of which he has been good enough to present to the Society, are therefore of exceptional interest. As will be seen from the titles, the subjects are varied, and have been well chosen to illustrate the types of natives, their mode of life, dwellings, industries, customs, dances, etc. The photographs are half-plate size, and most of them are extremely good.

(1) Dancing girls, Bandasuma; (2) Poro boys, Gaura country; (3) Upper Mendi chief; (4) Group of Bundu girls, Vassa country; (5) The slave trade, Mongeri; (6) Balenjeh players, Sulima; (7) War boys, Bombari country; (8) A Fetish dwarf, Bambara country; (9) Bundu devil, Upper Mendi; (10) The Nefari devil dance, Sulima; (11) Mendi women fishing, Gigbama, Tunkia; (12) Graves at Waima, Konno country; (13) Dancing girls, Sulima; (14) Group of Tasso men, Imperri, Sherbro; (15) Pounding rice, Mendi; (16) Poro boy, Juru, Mendi; (17) Bundu girls, Upper Mendi; (18) Bunju dancers, Upper Mendi; (19) Group of chiefs, Sulima; (20) Mendi women playing the Sehgura; (21) The Pamawura flower, Upper Mendi; (22) A camwood tree, Upper Mendi; (23) The town drums, Massaia, near Falaba; (24) Weaving cloth, Massaia; (25) Dancing girls, Barri country; (26) Bundu devil and her Digbas; (27) Mendi boys beating the Samba (tom-tom); (28) Mandingos playing the Balenjeh, Falaba.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

ORDNANCE SURVEY MAPS.

The following is a list of the various Ordnance Survey Maps of the British Isles on sale to the public, together with the prices. E. Stanford, 12, 13 and 14, Long Acre, W.C., is the London agent; there are also provincial agents in most of the important towns of England, Scotland, and Ireland. In places where no agent exists, the maps can be obtained through the principal local post offices.

1-inch Scale.

	Price per sheet. s.	d.
1. England and Wales, old series, in black, with outline and hill hachures.		
Size 36 × 24	2	6
Size 18 × 12	1	0
2. Ditto, outline, contours in black, latitude and longitude marked. Size 18 × 12 inches. On paper	1	0
3.*Ditto, hills hachured in brown, latitude and longitude marked. Size 18 × 12 inches. On paper	1	0
4.*Ditto, hills hachured in black, latitude and longitude marked. Size 18 × 12 inches. On paper	1	0
5.*Ditto, hills hachured in brown, contours red, roads brown, water blue, magnetic variation shown, latitude and longitude not marked. Size		

* Publication in progress.

	Price per sheet. s.	d.
18 × 12 inches. On linen-backed paper, either flat (with a few exceptions) or folded in covers. Single sheets	1	0
Combined sheets	1	6
6. Scotland, outline and contours in black, latitude and longitude marked. Size 24 × 18 inches. On paper	1	9
7.*Ditto, hills hachured in brown, and black contours, latitude and longitude marked. Size 24 × 18 inches. On paper	1	6
8. Ireland, outline, not contoured, in black, latitude and longitude marked. Size 18 × 12 inches. On paper	1	0
9. Ditto, hills hachured in black, latitude and longitude marked. Size 18 × 12 inches. On paper	1	0
10.*Combined maps of areas round certain large towns, or other areas, such as the New Forest and Lake District, and published in various forms and sizes. These maps usually show outline and contour in black and roads in brown. In sheets, unmounted 9*d.* to	1	0
Folded in cover 1*s.* to	1	6
4 Miles to an Inch.		
11.*England and Wales, engraved in black, latitude and longitude marked, no hill shading or contours. Size 22½ × 15 inches. On paper	1	6
12.*County maps, cheap edition, roads in brown, latitude and longitude marked, on thin paper or folded in covers. Kent, size 22½ × 17 inches. Northumberland and Durham (combined), size 17⅞ × 23⅝ inches. In sheets, unmounted	0	6
Folded in covers	0	9
6-Inch Scale.		
13. Great Britain, water coloured blue or black lined, contours in black, latitude and longitude marked. Heliozincographed and photozincographed. Size 18 × 12 inches	1	0
Engraved or photozincographed (where not published in quarter sheets). Size 36 × 24 inches	2	6
14. Ireland, engraved or heliozincographed, contours in black, latitude and longitude not marked. Size 36 × 24 inches	2	6
$\frac{1}{2500}$ Scale.		
15. Houses ruled in black, water blue or black lined, latitude and longitude not marked. Size 38 × 25½ inches	3	0
16. Houses red, water blue, roads brown, latitude and longitude not marked. Unrevised editions only coloured in this form. Size 38 × 25½ inches. From 2*s.* 6*d.* to 23*s.*, according to the amount of colouring. This form is gradually being superseded by 15.		
Town Scales.		
17. $\frac{1}{500}$ scale, houses stippled. Size 38 × 25½	2	6
18. Ditto, houses ruled. Size 38 × 25½	2	6
19. Ditto, houses red, water blue, roads brown. Size 38 × 25½ inches. From 2*s.* 6*d.* to 15*s.*, according to the amount of colouring. Applies to unrevised only.		
20. 5-feet scale, houses stippled. Revised. Size 36 × 24 inches	2	6
Index Maps.		
21. Indexes to the sheets of the 1-inch scale maps of England and Wales, Scotland, and Ireland, scale 30 miles to an inch. Sizes about 18 × 13 inches	0	2
22.*Index to the sheets of the 6-inch scale map, parishes coloured. England and Wales. Size 18 × 12 inches	1	0
Scotland. Size 24 × 18 inches	1	9
23.*Index to the sheets of the 1 : 2500 scale map, parishes coloured. England and Wales. Size 18 × 12 inches	1	0
Scotland. Size 24 × 18 inches	1	9

Nos. 22 and 23 are identical with Nos. 2 and 6, but with sheet lines added, printed on thin paper, and coloured to show civil parishes.

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* Publication in progress.

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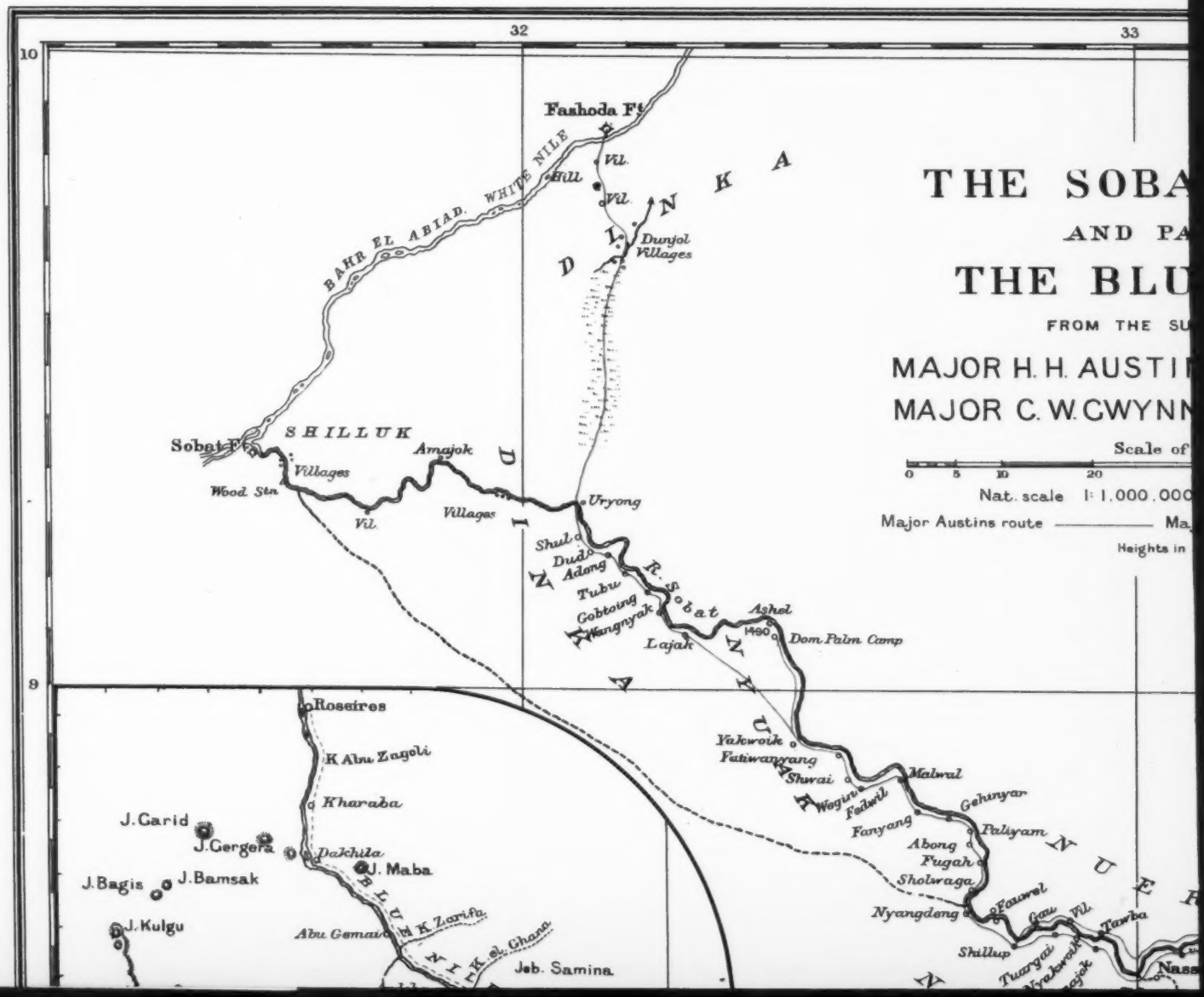
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K Zarifa
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Fedwil
Malwal
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Fanyang
Paliyam
Abong
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Sholwaga
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Gau
Vil.
Tawba
Shillup
Tuargai
Nyakwaik
N U E R
Nass

OBAT RIVER
D PART OF
BLUE NILE
THE SURVEYS OF
STIN D.S.O., R.E. AND
VYNN D.S.O., R.E. 1900.

Scale of Miles
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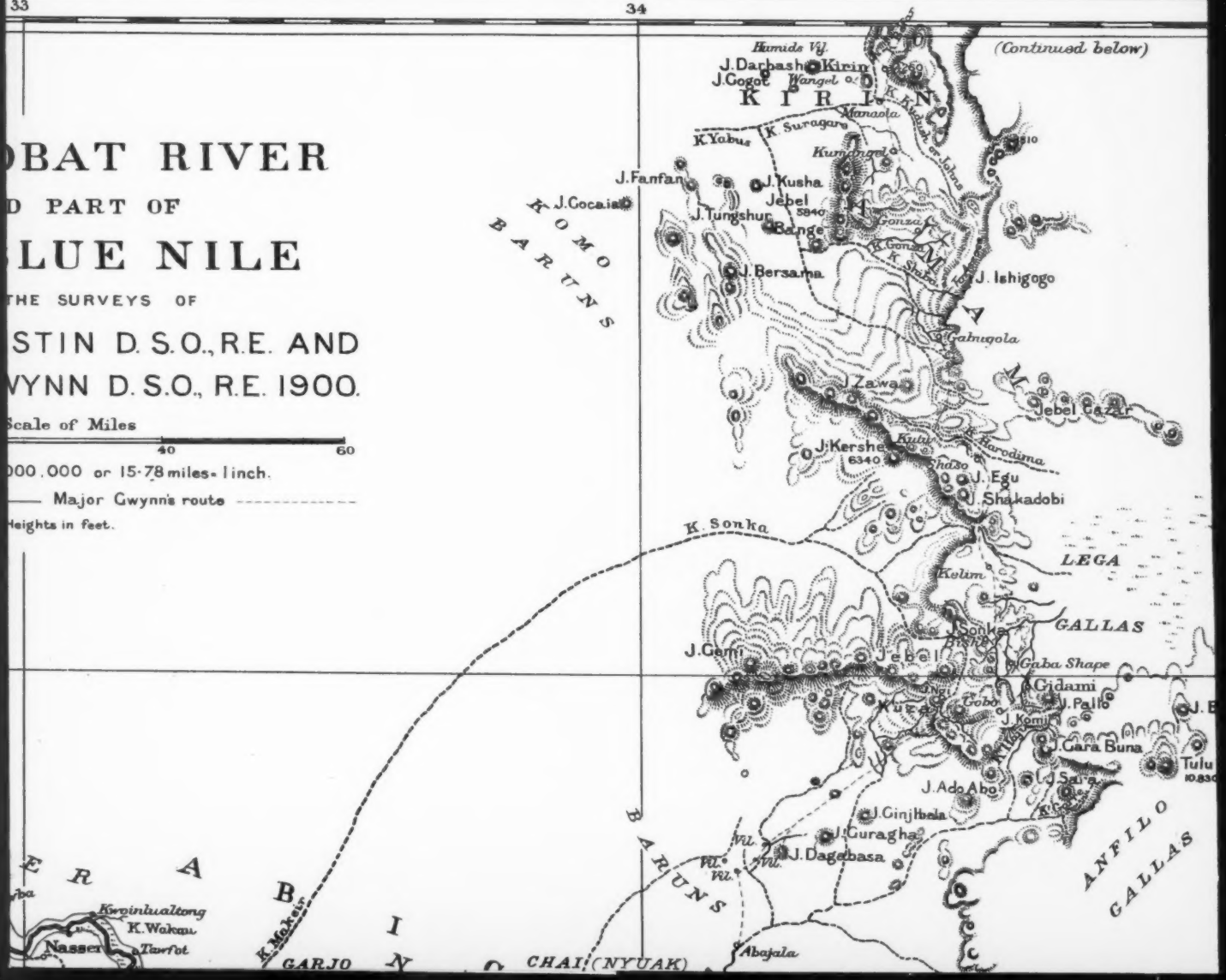
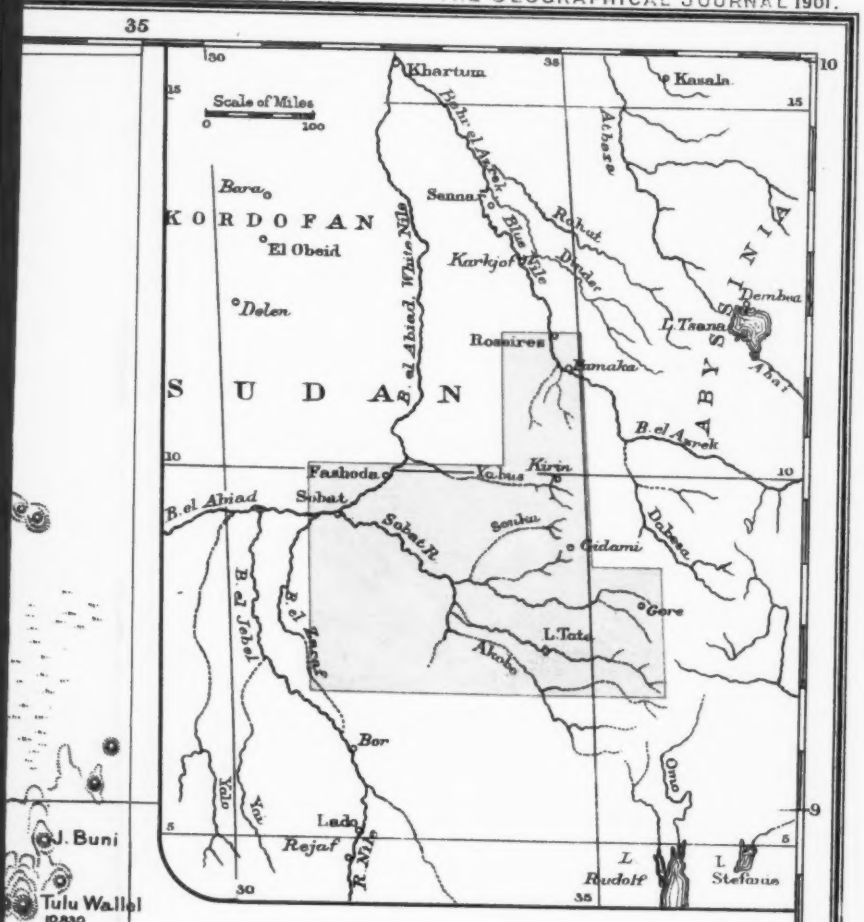
000,000 or 15·78 miles = 1 inch.
—— Major Gwynn's route ----------
Heights in feet.

33 34

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Dembea
L. Tsana
Delen
Rosaires
Famaka
Abai
SUDAN
B. el Abiad, White Nile
B. el Azrek
20
Fashoda
Kaka
Kirin
10
B. el Abiad
Subat
Sobat R.
Sanka
Gidami
Dabasa
B. el Jebel
B. el Zeraf
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L. Tata
Akobo
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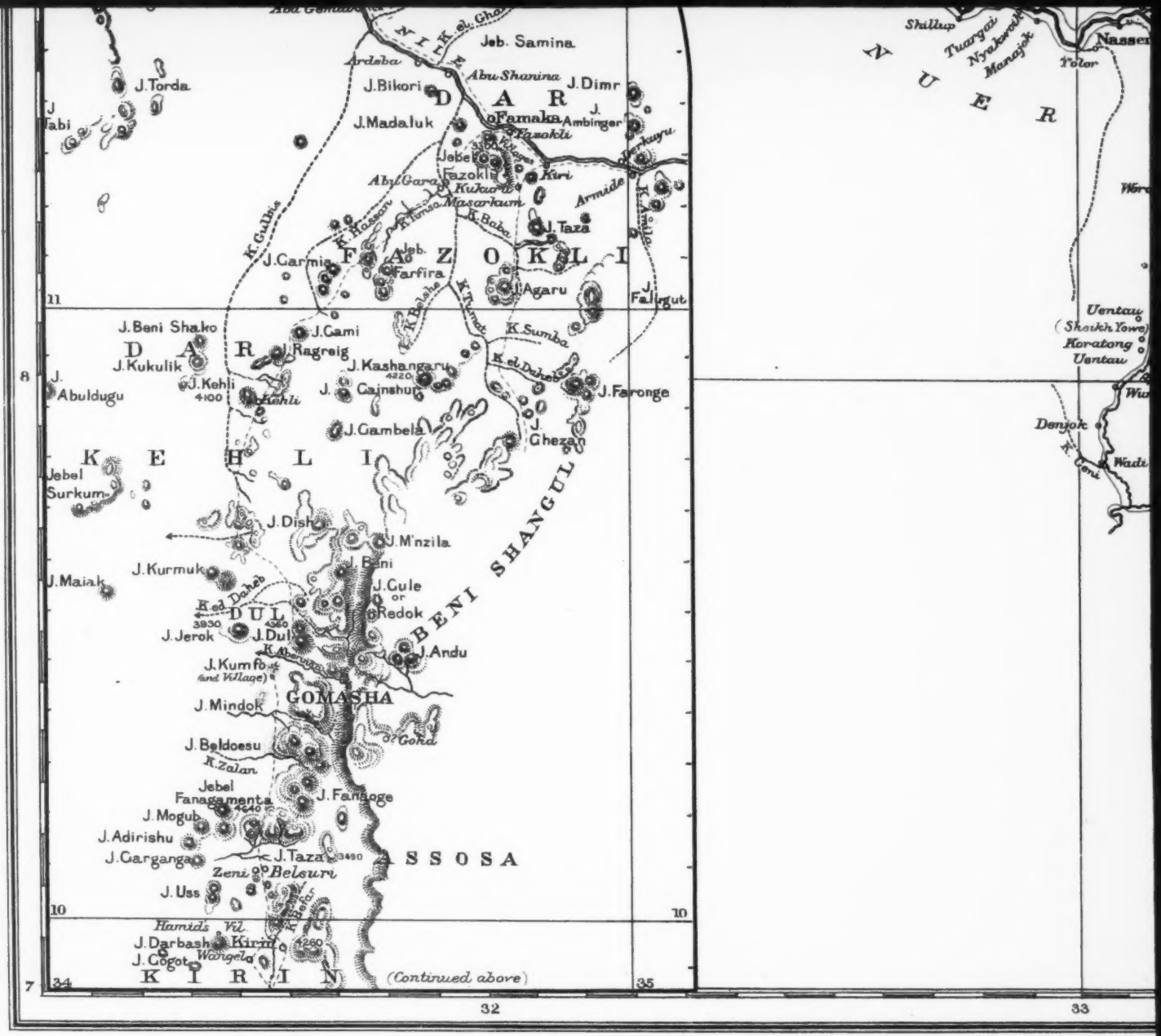
Jeb. Samina
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Masarkum
Armide
J.Taza
J.Carmia
F A Z O K L I
Jeb.
Farfira
Agaru
J.
Faligut
J.Beni Shako
J.Cami
D A R
Ragreig
J.Kukulik
J.Kashangaru
4220
J.
Abuldugu
J.Kehli
4100
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Cainshur
J.Faronge
J.Gambela
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Ghezan
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J.Dish
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J.Kurmuk
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or
Redok
D U L
3930
J.Jerok
J.Dul
J.Andu
J.Kumfo
(and Village)
GOMASHA
J.Mindok
of Gokd
J.Beldoesu
K.Zalan
Jebel
Fanagamenta
4240
J.Fantoge
J.Mogub
J.Adirishu
J.Garganga
J.Taza
3490
A S S O S A
Zeni
Belsuri
J.Uss
Hamids Vil
J.Darbash
Kirim
4260
J.Cogot
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Shillup
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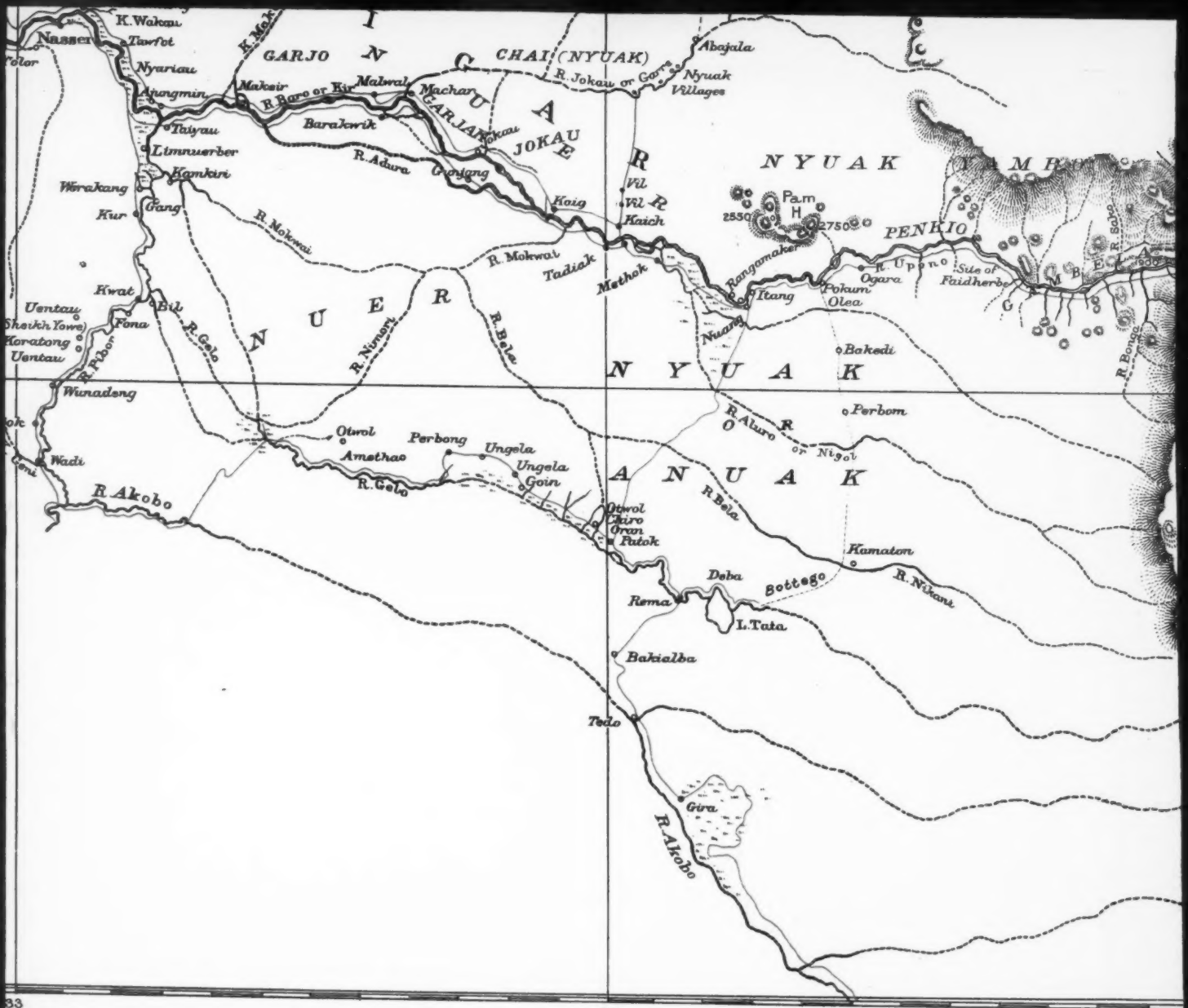

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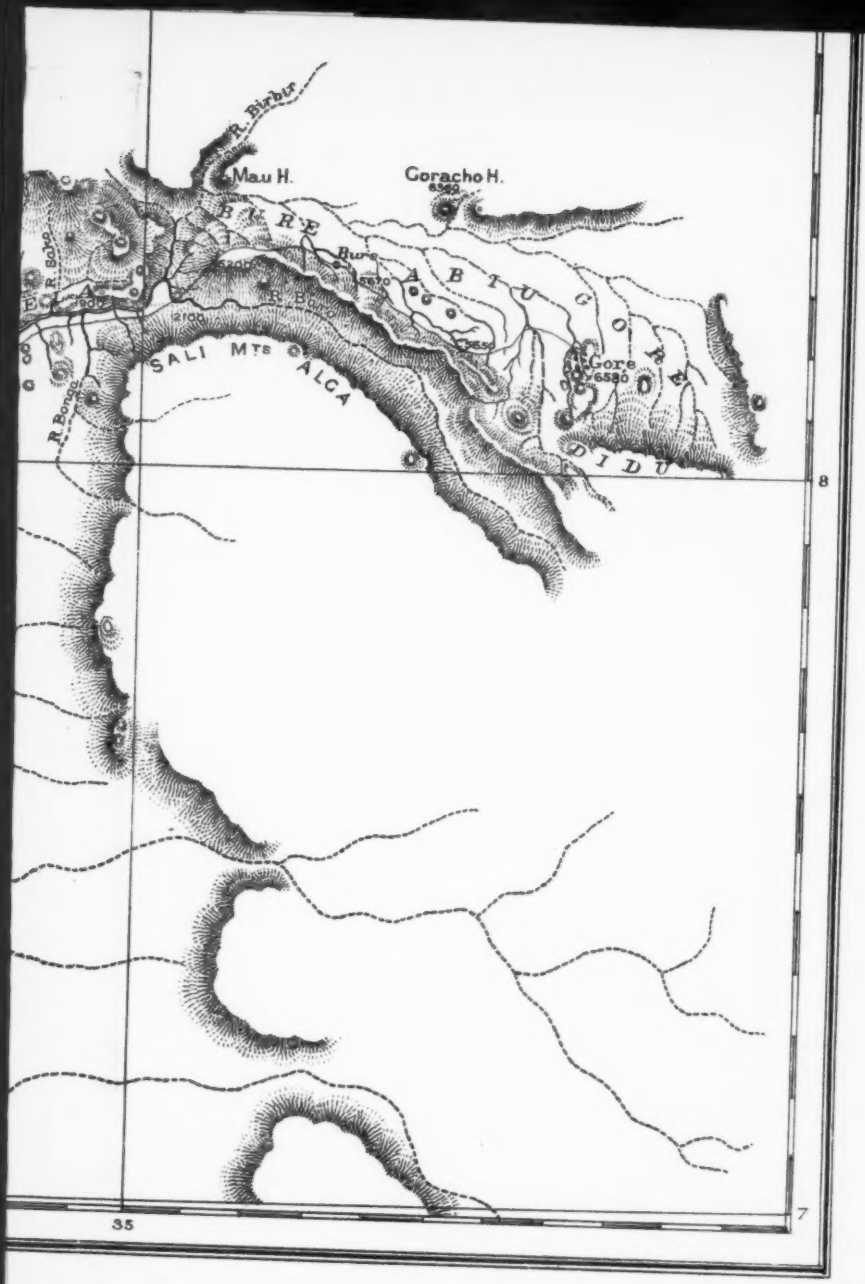
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